ECONOMICS OF EDUCATIONAL PLANNING IN INDIA

C. B. PADMANABHAN

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FOREWORD

I have great pleasure in responding to the request of my colleague, Mr. C.B. Padmanabhan, Economist in the Asian Institute of Educational Planning and Administration, to say a few words about his book on "Economics of Educational Planning in India". Educational Planning is a comparatively a young discipline. Also, it involves a good bit of interdisciplinary activity. UNESCO has actively promoted studies and training in Educational Planning and Administration by setting up an International Institute at Paris and four Regional Institutes in Latin America, Africa, Arab States, and Asia. Mr. Padmanabhan has been lecturing to our trainees in this Institute since 1965 and has developed special interest in economic aspects of educational planning. He has made a study of Educational Planning in the Union Territory of Delhi with special reference to Financing and Costing, 1950—1968, which has been brought out by the International Institute for Educational Planning, Paris.

In our own country, planning for economic and social development has been going on for almost a quarter of a century. Currently the problem of unemployment of the educated is engaging the serious attention of planners. One of the ways in which it can be tackled is by comprehensive and purposeful planning of education in our country, keeping in view our socio-economic situation.

Mr. Padmanabhan's book is an attempt to provide the techniques of economic analysis to the educational administrators of our country with the help of which such a comprehensive planning could be done. I have every hope that this book will serve that purpose and provide a basis for further discussion and studies in this field.

M. V. MATHUR
Director,
Asian Institute of Educational
Planning and Administration,
New Delhi.

PREFACE

Education is no longer regarded as a social service which every government has to provide to its citizens. It is an investment which will help the growth of the economy of a country. Therefore, in recent years larger amounts of resources are being devoted to the educational development of the developing countries. In India also, we are spending large percentages of the budgets of the States and Central Government on education. It cannot, however, be said that we have reached a satisfactory stage in the development of our educational system. Literacy is available only for a fraction of our population. We need large resources for our educational development.

The view that education is an investment also carries with it the implications that every effort must be made to make the best use of all the resources available for education. Economics is essentially concerned with the problem of making the best use of the limited resources and therefore educational administrators will find it quite useful to be familiar with the concepts and techniques of economic analysis. It is our earnest hope that this will provide the insights to the educational administrators in India and other developing countries regarding the economic aspects of the functioning of Indian educational system.

I wish to take this opportunity for thanking Prof. M.V. Mathur, Director, Asian Institute of Educational Planning and Administration, New Delhi, for having been good enough to write a foreword for this book.

I have been working at the Asian Institute of Educational Administration for the last few years and the thoughts contained in this book are the result of my thinking on this subject, developed in the course of teaching economic aspects relating to educational administration of developing countries of Asia. The views, however, are personal to me. Comments and suggestions for improvement will be gratefully received.

Gandhi Jayanti, 1971
New Delhi.

C. B. PADMANABHAN

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Introduction

In recent years particularly after the second World War professional economists have been associating themselves with the process of educational planning in several countries of the world though the extent of their association has been varying from one country to the other. Theories of economic growth and principles of economics have recognised the importance of education in a country for its development though there is no agreement on the precise role that can be assigned to it for promoting economic development. The study of the principles of economics and techniques of economic analysis and an understanding of the process of economic growth will be found useful in educational planning on account of the following reasons :

(*a*) Planning and economics have something in common—both of them are responses for the challenges arising out of the scarcity of resources and possibility of alternative uses and maximum utilisation of limited resources.

(*b*) Planning for economic development has become common in almost all the countries of the world.

(*c*) Educational Planning is also part of the overall planning for social and economic development. Objectives of education find a place in the overall planning for social and economic development and plans have to provide for financing educational development for meeting these objectives.

(*d*) Education is in addition a public service, demand for which is in excess of the supply that any Government is able to make. This is because of the unchanging birth rate, falling death rate and the consequent growth of population in the age group between 5-24 and the rising demand for education.

The existing work in economics is insufficient and does not meet the requirements of educational planners. Economics is mainly concerned with the functioning of the economic system and the process of economic growth. Attention has been given to education only to find out what contribution education has made to economic growth or in future can make. In this way a lot of attention has been given to education. But economic problems in the educational sector like ways of financing education or the cost of education (to mention only two important issues) have not received much attention.

Such a lop-sided development of interest on the part of economists in education is mainly because educational planning and the development of education is only a problem of one sector in the whole economy and in the overall planning for social and economic development of a country. But educational planner is mainly concerned with the educational development and problems that he will be facing even on the aspects relating to financing and costing of education will be very different.

For the purpose of this study educational planning is defined in a comprehensive way to include all stages right from the preparation of a project upto its evaluation. In this regard we can contrast the situation regarding educational planning from economic planning. In economic planning a great deal of attention is given to the preparation of a plan with all the technical details and the implementation is left to the market forces of supply and demand as well as operation of the profit motive. In the case of the educational sector there is no such motive as maximisation of profits which is in operation and market forces cannot be relied upon. Implementation of an educational plan has to be done through an administrative machinery and therefore, problems of implementation also have to be given adequate attention.

Even the concept of educational development calls for a definition. At present educational administrators make use of enrolment ratio of a particular age group as target. Deliberate efforts are made for reducing drop-outs and in this way retention ratio also becomes a target. But when education is regarded as an instrument for achieving other objectives of economic and social development the level of education of the labour forces of a country or a region in a country also becomes an important objective to be pursued. Further, there is also the question of the structure, content and methods included in the educational sector and strictly speaking educational development will have to take into account all these variables.

In the light of the above discussion we may classify the economics required for educational planners under the following three broad divisions :

I. General economics—theory and principles ;
II. External economics of education which is concerned with relationship of the educational activities with the functioning of the economy ; and
III. Internal economics of education which is concerned with the economic aspects of the functioning of educational system.

I. General Economics : Under this section we shall discuss the principles of economics that are required by educational planners for their work in educational planning and in understanding the functioning of the economic system. Examples of such concepts are consumption, production, investment, savings and capital formation. In this section, the concept of national accounts will be discussed in great detail because that is the base upon which planning is being done in all countries of the world.

The process of economic growth is described with the help of the concepts that are used in national accounts. The factors that determine the growth of economy will also be discussed.

While national accounts help us to know the size of the overall economy, distribution of the population among different sectors of economic activity like, agriculture, industry and service shows the way in which national income is at present produced by the people who are engaged in economic activity. The growth of national income comes about as a result of change in the way in which people are distributed in the different economic sectors and a rise in the productivity. Economic planner is interested in bringing out such a change in the distribution of population.

The educational planner will find it an advantage to know about the actual dynamics of shift from one economic sector to another.

The concept of the budget and the way in which resources are allocated to different sectors of social and economic activity is another important item on which it will be useful for the educational planner to be well informed. When the allocation of resources to education is taken into account it will be found that there is shortage of resources available for education and it will be necessary to ensure that better use is made of limited resources.

Economics for Educational Planners in India

Planning for economic development has been going on in India and we are currently in the midst of the fourth Five Year Plan. But the situation regarding the educational planning in the country has been different. The Planning Commission appointed a Working Party to enquire into the educational planning, administration and evaluation in India and it recommended a number of measures to be adopted for overcoming the deficiencies in the existing processess of educational planning in the different States of India. In the opinion of that Committee "the first important reform needed was preparation of a comprehensive educational plan which should deal not merely with the allocation of resources provided by the Central and State Governments to different sectors of education and within a given sector but different types of programmes but also with the present educational situations, educational objectives in view and the programmes proposed to realise these objectives. It should thus cover planned as well as non-planned programmes that involve finance and those that do not and also programmes for better utilisation of existing facilities and economising expenditure. The linkage with programmes of social and economic development should be much closer than at present."*

A close analysis of the above statement in regard to the nature of comprehensive plan shows that it should have the following elements :

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* Page 14. Educational Planning and Administration and Evaluation in the fourth Five Year Plan presided over by Mr. J.P. Naik, Adviser, Ministry of Education, Government of India.

1. Analysis of the present educational situation ;
2. Setting up of educational objectives ;
3. Identification of the programmes in order to achieve these objectives ;
4. Process of allocation of resources to education by the Central and State Governments to different sectors of education and within each sector, different types of programmes covering both the planned and non-planned expenditure and programmes involving finance as well as those without ;
5. Programmes for better utilisation of facilities and for minimising expenditure ; and
6. Better linking up with programmes of social and economic development.

These steps which have been laid down by the report of the Working Group calls for an understanding of the economic situation of the State in which educational planning is done, the programmes of social and economic development that are being adopted by the State and Central Governments and the objectives that they are trying to achieve and the limitations on finance that is available for developing education at all levels. In addition it also calls for the ability on the part of the educational planner to handle techniques of economic analysis with the help of which it is possible for him to know whether resources are used to their full capacity and possibility for getting better result from the present expenditure. In the context of the Five Year Plan for social and economic development that are being implemented by the Government of India and in the face of shortage of resources that characterises Indian economy, it is quite appropriate that the Working Group should have emphasised the need for comprehensive educational plan. In the following pages we shall present the techniques of economic analysis and principles of economics which the educational planner will find useful in formulating and implementing such a comprehensive educational plan.

1

The Evolution of Modern Approaches to Educational Planning

In this chapter we shall trace the evolution of the modern approaches to educational planning. Since there is a world-wide trend in modern approaches to educational planning our attention cannot be limited to India alone. But our main object is to draw the attention of educational planners and administrators to India to the modern approaches to educational planning and point out the usefulness of economics for such a planning and therefore, we shall analyse the Indian situation in a world-wide context.

A report of working party on educational planning, administration and evolution has identified the following deficiencies in educational planning in India.

(*i*) They deal with only those programmes which have financial implications and do not give a total, coherent and integrated picture of educational development.

(*ii*) They generally deal with expenditure incurred from State or Central funds but do not reflect all expenditure incurred on the development of education.

(*iii*) They do not deal with non-plan expenditure on education which now forms the bulk of the total educational effort.

(*iv*) They over-emphasise targets of enrolment and financial expenditure and generally tend to neglect other aspects of educational development such as effecting economies, discovering less-costly techniques of development, intensive utilisation of existing facilities and other programmes which are significant but not susceptible to statistical or financial measurement.

(*v*) The State Education Departments set up working Groups comprising mostly, if not wholly, of officials to formulate plans and programmes. These groups generally work in isolation. There is little involvement of experts and of other agencies interested in the formulation of plans. The District Education Officials are not generally invited to cooperate in these exercises and, where they are required to do so, their contribution is not very effective. due mainly to lack of training. By and large, teachers and their organisations are not involved in the planning process nor is an adequate opportunity provided to voluntary organisations and others interested in education to put forward their views before the plans are formulated and finalised.

(*vi*) The system is top heavy and resembles an inverted pyramid because most of the planning is done at the national and State levels only. If the best results are to be obtained, an integrated process of planning will have to be evolved and well-coordinated plans will have to be prepared at the institutional, district, state and national levels.

(*vii*) The preparation of detailed projects which would help implementation is also generally neglected. Educational programmes have to be treated as projects in the same way in which projects for industry, irrigation or power are drawn up. We should be clear, not only about the objectives we want to achieve, but also about time-passing, advance action needed, inputs required in terms of incentives, materials and skills, administrative machinery and the dovetailing of all these in time and space in order to ensure that the desired targets are achieved. Such projects are conspicuous by their absence at present.

(*viii*) The Planning Commission and the Ministry of Education discuss their Five Year Plan and annual plans with the State Governments. Those plan discussions are not as thorough as they should be because the preparation often leaves much to be desired. What is worse, there is hardly any follow-up action and once the discussion on any annual plan is over, the matter is remembered only when the discussion for the next annual plan is taken up in the following year.

(*ix*) A large number of agencies look after different aspects of educational planning. For instance, at the national level, the Ministry of Education, the Ministry of Food and Agriculture (including Community Development), the Ministry of Health, the Ministry of Labour and Employment of Social Welfare and the Ministry of Home Affairs (in respect of Scheduled Castes and Scheduled Tribes) are concerned with educational planning in some form or another. In States also, there is corresponding multiplicity of agencies. The coordination between these different agencies is often weak.

(*x*) The areas where education has to be bridged with life also tend to get neglected. For instance, the dovetailing of educational plans with the requirements of manpower or employment opportunities has not been successful. Similarly, programmes which emphasise thought and human effort also tend to be neglected in preference to those which emphasise monetary investment.

In order to rectify these defects the working group has suggested among other things preparation of comprehensive plan. In order to prepare such comprehensive plans economic analysis and techniques will be found useful.

The realisation of the necessity for a comprehensive planning is world-wide in character. We can identify the following stages in the evolution of the modern approaches to educational planning.

(1) Prior to World War II educational planning had to be done under conditions of slow growth and change.

(2) In the post War era a new role came to be assigned to education as a possible factor in promoting economic growth combined with the rising demand for education by everyone.

(3) A new kind of educational planning emerged which had the following characteristics :

  (*a*) comprehensive coverage of the educational system ;

  (*b*) a longer time perspective ;

  (*c*) integration with economic and social development through manpower and financial linkages ;

  (*d*) attention to qualitative aspects and innovations.

In order to adopt a plan on the basis indicated above a system analysis approach to educational planning has been suggested. The main components of such a system analysis has been indicated in a book called "World Educational Crisis" by Philip Combs. In this approach concepts and techniques are drawn from many social sciences and engineering. Since our object is only to illustrate the usefulness of economics in educational planning we are not going into other details.

Beeby draws attention to the new dimensions in educational planning and their contrast from traditional educational planning.*

The following are the most important elements in the new dimension of educational planning :

(1) There is an intense interest on the part of the educational planner in economic growth, in human resource development and in what economists call

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*Planning and Educational Administration by C.E. Beeby—P. 14.

macro planning—the simultaneous consideration of a country's all inter-locking development plans.

(2) "The Costing of a Global Scheme in advance with a constant eye on the country's economic plans and potentials and on its manpower needs."

What is now needed is a synthesis between the traditional approaches and the approach of the economists for which a knowledge of economics is essential for educational planners and for the economists a knowledge of the functioning of the educational system is equally essential.

2

Basic Concepts in Economics Relevant to Educational Planning

In this chapter we shall explain the basic concepts in economics which would be found useful in educational planning. Our object is only to introduce the reader to the basic concepts in economics which are relevant to educational planning and therefore, all the economic concepts have not been dealt exhaustively.

Planning and Economics

There is a close affinity between planning and economics because both are concerned with problems arising out of the scarcity of resources, alternative use of these resources and multiple ends or objectives to be satisfied. Planning of some kind has been going on for many years in all kinds of activities like education, health or industry, but what characterises the modern approach to planning is that it is development oriented. Development includes economic, social and cultural aspects. Arthur Lewis—the eminent economist refers to it as developmental planning.*

The approach of the economist is to look at the society from the point of view of its economy. The major aspects in the functioning of an economy are the processes of production, consumption and distribution of wealth. The very reason why a person takes to an economic activity or a society has an economic dimension to its activity is because there are wants which have to be satisfied. The process of satifaction of wants is called consumption.

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*Arthur Lewis—Development Planning.

Goods and Services

Wants of the individual are satisfied by the consumption of goods like wheat or cloth or services like transport or education. When a government is trying to satisfy the wants of a number of persons in a society, it is said to be providing a collective good or service. Thus education is a collective good which is wanted by all the persons in a society.

Utility

Utility is a word commonly used, but in economics it refers to the ability of a good or service to satisfy a want that is expressed by an individual. If the want for a commodity exists and that commodity is scarce, it is said to have utility. Goods like air and water are normally available freely and therefore, they are said to be free goods. However, when a government undertakes to provide good drinking water facilities in a big town, it becomes a good or a service in the economic sense.

Goods and Services

Goods like wheat, rice, cloth and services like transport, education have to be produced with the use of factors or agents of production which are land, labour, capital and organisation. These factors of production have different uses and at a point of time these have to be used for producing one commodity rather than another. Thus there is the problem of choice involved and this is the major concern in economics. In fact economics has been defined as "the study of the realationship between multiple ends and scarce means which have alternative uses."*

The Concept of Margin

The concept of margin is a central one in economic theory. The problem of choice always arises at the margin. Thus a consumer with a limited amount of income has to decide how much more he will spend on rent rather than on his food. It is not as though he has to deprive himself of his food and give everything as rent or vice versa. He has to decide whether it is worthwhile giving Rs. 50/- more as rent and have an economy on some other item or not. Similarly, a planner has to decide how much more has to be spent on education rather than development of general education. In deciding on this he has to take into account not the total contribution made by vocational educational programme but the additional contribution likely to be made by the vocational educational programme and the resulting increase in the attainment of whatever objective has been set. In this manner all problems of choice arise at the margin. (This will be discussed later in the Chapter on Cost Benefit Analysis).

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*L. Robbins—Nature and Significance of Economic Science.

Theory of Consumption and Theory of Production

The theory of consumption states that as a person acquires more of a commodity, his marginal utility for that commodity will diminish. This is called the law of diminishing marginal utility. Therefore, he will stop consuming that commodity at the point at which he derives maximum utility and therefore, it begins to fall. This point is called the point of equi-marginal returns *i.e.* the point at which the marginal utility derived from consuming various commodities is equal. While the above theory is from the field of the behviour of a consumer it has its counterpart in the field of production. When the factors of production are combined to produce a commodity, after a certain stage is reached the marginal returns will fall. This is called the law of diminishing marginal returns.

Application of the Law of Diminishing Returns to Education

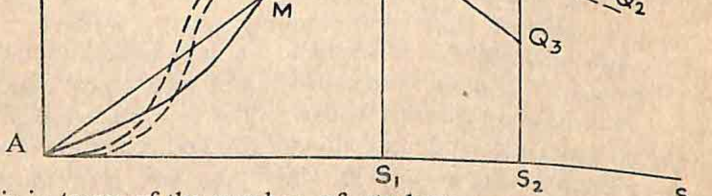
Many of the laws in economics could be applied to education. For that purpose we can regard education as a big industry which uses resources from the economy in the form of men, money and materials. The educational sector by which we refer to the formal educational systems consisting of schools, colleges and other institutions of learning converts the raw materials in the form of students into graduates who are good citizens contributing to the growth of the society in which they live. By comparing education to an industry, it should not be thought that the nobler aspects of educational activity are decried. Good education is wanted by all even as good food or clothing is wanted. The problem of scarcity of resources required for running an educational enterprise exists and hence education is compared to an industry.

The whole of the educational enterprise can be regarded as an industry and every institution in it is a firm even as tyre making is one industry in which one brand of tyre—called Dunlop or Firestone—is produced by a firm. Apart from the fact that education has to contribute to the satisfaction of a higher purpose, it has to be pointed out that a major motive *viz.*, maximising profit which actuates the activities of an economic enterprise does not exist in education.

With all these differences for analytical purposes some of the principles of economics like the law of production can be used.

An Illustration of Application of Production Theory to Education

We can apply the principles of production theory to education viewing it as an industry. Education industry produces educated people. For the purpose of planning this industry, we can make use of the concept of efficiency of its operation in furthering all the goals of education which include education as a goal in its own right—or consumption and also contribution it makes to the achievement of other goals like economic and social development—investment. The following diagram shows the total production curve. Output is measured on the vertical axis in terms of the number of students passing examination of a given standard. It can be weighted in accordance with the number of years of training and by type of training and grade. For primary school students, total students years of training is



probably a close enough approximation to true social product. For higher education, one may wish to assign different weights to different types of products (engineering *versus* lawyers) and to students of different quality (1st class or bare pass) in accordance with the studies of manpower requirements and the priorities established for the overall plan. On the horizontal, axis is measured inputs of the variable factor of production *i.e.*, intake of beginning students. The fixed factor of production consists of class rooms with trained teachers in them (usually it is the supply of trained teachers which will be the major bottleneck in expanding enrolments).

The curve of total returns might be expected to assume a normal growth curve shape. Returns in terms of number of students passing examinations of given standards can be expected to increase at an increasing rate, as intake of pupils' rise to a certain point. (M—or point of diminishing marginal returns in the diagram). Beyond this point, returns will rise at a decreasing rate become zero (at point T) and then fall. The point of maximum returns per pupil taken into the system is at point A, the point of diminishing average returns. Upto point A, the marginal returns to the fixed factor—(class-room with trained teachers) is actually negative *i.e.* when there are few students, it is not worthwhile having so many class rooms and teachers. This may be the situation in some schools which have been built in rural areas). If the supply of the students is so small, it would be advisable to release the teachers and class rooms to other uses. Beyond T, the marginal returns to additional intake of students are negative. Class rooms become so crowded and the student teacher ratio so high that the numbers passing examination of fixed standards actually falls as more students are admitted.

In order that the system may operate efficiently with the given stock of teachers and class rooms, the number of students admitted should be between A and T. If the objective of the educational policy is to produce education in the sense of number of students passing examinations of appropriate standards, there would be no justification for taking more students than actual. This however, is not the case in many countries. Beyond T the marginal returns to additional intake of students are negative. Class rooms become so crowded and student-teacher ratio so high that the number passing examinations actually fall as more students are admitted.

If the system is to operate efficiently, the number of students that could be taken in with the given teachers, class rooms and equipment should be between A and T. This is the case only if the objective is to ensure that the number who come out successful for a given intake of students is to be maximum. If the object of the policy is to ensure that everybody who is in a certain age has to be given a place in the school and ensured that every student successfully completes the level of education then more equipment, class rooms and teachers whould have to be found. A graphical approach on these lines will help us to know how much of additional buildings and class rooms and how many additional teachers will have to be found.

Productivity

A basic concept in relation to the process of production is productivity. This can be defined simply as the product per unit of effort or factor of production. It is usual to speak of land, labour, capital and organisation as the four factors of production which are combined with each other and production process is organised. Productivity is the product divided by the number of units used for producing it. Thus productivity of land is total production divided by the number of units of land used in the production process. Productivity of labour is total production divided by the number of units of labour used for production. A major task of economic development is to bring about rise in the productivity in every sector of the economy.

The sum of all the productive activity taking place in a country at a point of time is expressed in the national accounts of a country. The most important concept in national accounts is gross national product.

Gross National Product (GNP)

Gross National Product is the value of all goods and services produced every year in a country. This is usually expressed in the form of the currency of that particular country.

Gross National Income or National Income

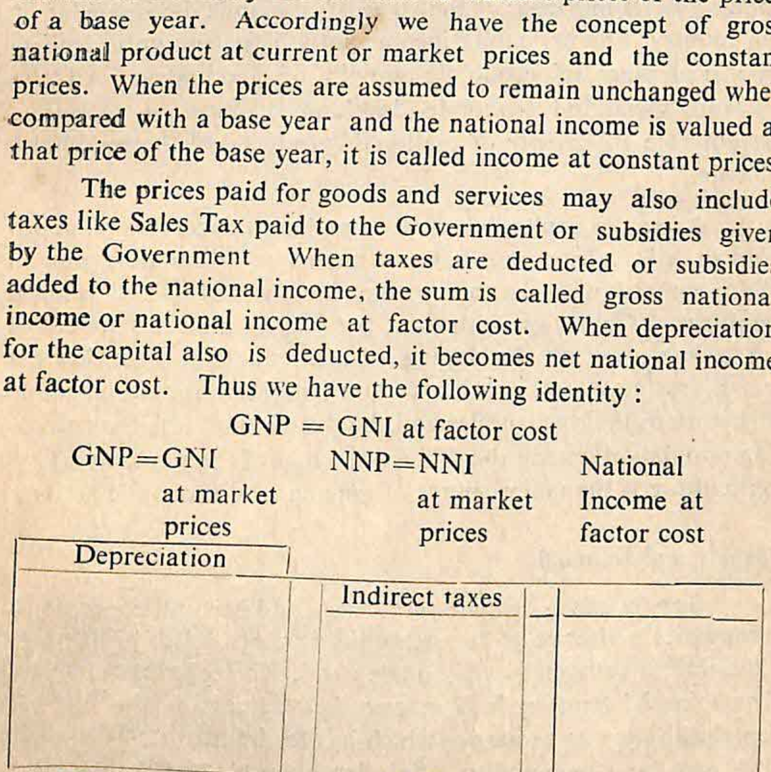
Gross National Income or as it is sometimes called briefly National Income is the sum of all the incomes (which are wages, profits, interests and rent) earned by the factors of production called labour, enterpreneur, capital and land in the production of gross national product.

GNP at Current Prices or Market Prices and Constant Prices

The evaluation of the total production of goods and services in a country can be made at current prices or the prices of a base year. Accordingly we have the concept of gross national product at current or market prices and the constant prices. When the prices are assumed to remain unchanged when compared with a base year and the national income is valued at that price of the base year, it is called income at constant prices.

The prices paid for goods and services may also include taxes like Sales Tax paid to the Government or subsidies given by the Government When taxes are deducted or subsidies added to the national income, the sum is called gross national income or national income at factor cost. When depreciation for the capital also is deducted, it becomes net national income at factor cost. Thus we have the following identity :

GNP = GNI at factor cost



(*Source* : "National Income Analysis—C. L. Shultz)

Gross national product is used for consumption, *i e.*, immediate satisfaction of wants or for investment *i.e.*, for increase in the production capacity of the economy or the economic system. Investment is also called capital formation and it comes out of the savings done by the society. Usually the savings done is expressed as a percentage of national income which is generally not more than 10 or 11% in countries like India while it is 20% and more in developed countries.

Per Capita Income

When the gross national income or gross national product is divided by the total population we get the per capita level of income. It is usual to speak of the per capita income of a country as an indicator of the stage of economic development of the country. The per capita income growth per annum is accepted as a measure of economic growth of a country. All the plans for social and economic development have as targets a certain rate of growth of national product and the per capita income.

A low per capita income is a major characteristic of countries in Asia, Africa and Latin America. This stands out in sharp contrast with the per capita incomes of the developed countries. Countries with low per capita incomes are called underdeveloped or developing. Such countries with low per capita incomes also exhibit certain characteristics in regard to structure of their economies and the distribution of their working population among the different sectors of the economy. Thus agriculture is the major source of income and economic activity.

Supply and Demand

Supply and demand are two fundamental concepts in economics and price of a commodity is supposed to bring about equilibrium between supply and demand. The concept of demand has a special meaning in economics *i.e.*, demand backed up with purchasing power or money which has to be distinguished from the need for a commodity. So also market means that it is backed up with money or buying capacity. If buying capacity is widespread in a country, we say that the market is wide. In the absence of purchasing power there may be need on the part of the people but economists will not call it demand. Thus in projecting future demand for education, it becomes necessary not merely to look at the probable growth of population in the relevant age group, but also at the probable trend in the level of income.

Economic analysis can help in projecting social demand for education by taking into account the following factors :

(*a*) How is the income likely to grow—this can be answered by taking into account the probable rate of growth of gross national product.

(*b*) How is the pattern of distribution of income likely to change ?

(*c*) How is the present distribution of income and demand for education related with each other ?

(*d*) How is the demand for education responding to changes in the levels of income on the basis of past experience.

Manpower

The concept of manpower has now become common. It refers to the educated person who is to be used in the process of production. It can readily be seen that it is the skill of the educated person which is going to be used and therefore, manpower refers to the skill that has been given to a person as a result of his education.

Cost

The concept of cost is a central one to economics. All cost is opportunity cost in economics and it can only be understood in terms of displaced alternative or what is foregone. In this line of reasoning, the cost can be looked at from many points of view—from the point of view of individual, from the point of view of the society or from the point of view of the Government.

For the sake of convenience, the cost of anything in a modern economy is expressed in terms of money. In the same way, we can also express the cost of education to the individual, to the society or to the Government.

Unit Cost

The cost per unit of a commodity can be called unit cost. In education, the cost to the Government per pupil is the unit cost to the Government. Similarly, one can express the cost per class room or cost per school.

Cost Benefit Approach

The essential idea underlying thinking in economics is that all decisions will be carried out within the framework of cost benefit analysis. Therefore, one of the major concerns of economic analysis is to try and find out the benefits of any activity. Therefore, attempt has been made to measure the benefits of education also. In organised countries like United States or U.K. the difference in the earnings of the educated people when compared with uneducated or those with lower levels of education is called the return from investment in education. When this difference in the earning of an educated person is taken into account for the whole life time of a person and discounted with an appropriate discount rate and when it is expressed as a percentage of the cost of education, it is referred to as the rate of return from investment in education. Economists have indicated certain approaches to educational planning on the basis of better methods of calculating social demand, rate of return from investment in education and cost benefit approach. It has to be emphasised that these approaches are not mutually exclusive of each other. They supplement each other.

Investment and the Capital Formation

In the process of economic development, investment or capital formation occupies a very important place. A society at any time has to make a choice between the present consumption and investment which will facilitate future consumption.

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Education in any country has been for a very long time regarded as a service item or a consumption item. But in recent years, it is realised that it is an investment item. Therefore, at present efforts are directed at finding out the nature of this investment on man *i.e.*, education.

Is Education an Investment or Consumption ?

A chapter on the basic concepts in economics relevant to educational planning will be incomplete without a discussion as to whether education is investment or consumption in a society. As long as want for a commodity exists and it has to be satisfied, it is said to have utility and it is a consumption good. The want for education exists and therefore, education is a consumption good. It is a consumption good different from other goods like cloth or food because it does not finish as soon as it is consumed. Therefore, it can be called a durable consumption good.

Is it Investment ?

It is also investment because the person who is educated is supposed to have the skills, attitudes and motivation which will increase his productive capacity of wealth and enable him to have higher earnings. But it is different from other kind of investment because the knowledge resulting from education has to be used along with machinery, *i.e.*, it is a joint input.

To what Extent the View that Education is an Investment can be Used in Policy Making

Though we can regard education as investment it is difficult to use it for policy purposes (*i.e.*, to decide how much has to be invested in education or whether a certain amount of investment in education is adequate or not). At any rate it has not been possible to use it for deciding on how much is to be invested in education and therefore, economists have been accused of talking in two voices ; one voice when they speak of education as an investment and another when it comes to a question of decision about the amount of money to be spent on education.

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The following are the reasons why it has been found difficult to apply the concept of education as investment :

(1) Education has not merely a quantitative but a qualitative dimension—the amount of education, the number of people with education, the structure of education (*i.e.*, the duration of different levels) and the content.

(2) The impact of education will vary from the social and economic background of the people to whom it is given.

(3) Even if it is granted that a certain level of education of a person has a positive impact on his productivity, there are several ways in which that education could be given *i.e.*, through general educational system or specific training outside the system or through mass media and other communication devices.

(4) Lastly, theories of economic development do not have an explanation as to what kind of attitudes or skills or motivations can accelerate the economic growth of a country. These are problems which are still engaging the attention of researchers and final answers are not available.

3

Economic Growth and Techniques of Projecting the National Accounts

In this Chapter we shall explain the concept of economic growth which has been the major objective of planning in developing countries and also the techniques of projecting National Accounts because that is the language in which the economic situation and economic growth is expressed.

Planning for economic development has been going on in India since 1951. So far there were three Five Year Plans and three annual Plans and a Plan for 1969-74—the Fourth Five Year Plan is in progress. Five Year Plans are drawn up in the background of a perspective plan which lays down broadly the desirable trend in the economy for a period of 25 years. Five Year Plans are only stages in achieving long term goals spelt out in the perspective plan. In the light of the achievements of every Five Year Plan the goal laid down in the perspective plan is reviewed.

In order to achieve the targets of the plan Central and State Governments have to raise resources either from taxes or loans and incur the expenditure. Table I at page 24 shows the plan outlay according to heads of development in the public sector. This is the total outlay which includes current outlay and development.

Objectives of Planning

Though the main objective of planning for economic growth in India has been to promote economic growth there

Table 1

Fourth Plan Outlay and Investment : Public and Private Sector

Head of the development	Current outlay	Total outlay	Investment	% distribution of total outlay
Agriculture and allied sector	610	2728	2118	17·1
Irrigation and flood control	14	1087	1073	6·8
Power	—	2448	2448	15·4
Village and Small Industries	107	2913	186	1·8
Industry and Minerals	40	3338	3298	21·0
Transport and Communication	40	3247	3197	20·3
Education	545	823	278	5·2
Scientific research	45	140	95	0·9
Health	303	435	132	2·7
Family Planning	262	315	53	2·0
Water Supply and Sanitation	2	406	404	2·6
Housing, urban and regional development	2	237	235	1·5
Welfare of backward classes	142	142	—	0·9
Social Welfare	41	41	—	0·3
Labour Welfare and craftsman training	20	40	20	0·3
Other Programmes	74	192	118	1·2
Inventories	—	—	—	—
Total	2247	18532	13655	100·0

have been other objectives also and the emphasis has varied from one plan to the other. The objectives have been :

(1) to accelerate the process of growth of Indian economy.
(2) diversify the structure of Indian economy by setting up a number of industries.
(3) increase the opportunities for employment.
(4) reduce the inequality of the distribution of income.
(5) maintain equilibrium in balance of payments.

The chapter on approach on policy in the Fourth Plan has highlighted the importance of other objectives like social justice and equality, reduction of income distribution, special assistance for the weaker sections and to landless labourers, correction of regional imbalances, increasing employment opportunities and providing a national minimum to everyone by attaining a reasonable level of average per capita income at the end of ten years. These are in addition to the specific objective of attaining an overall rate of growth of $5\frac{1}{2}\%$ per annum in the period 1968-69 to 1973-74.

In all the Five Year Plans development of education is included under the programmes for social services for development. Specifically the development of education has got included in the Five Year Plans in the following forms :

(1) through the setting up of targets for enrolment at different levels of education *e.g.*, attaining free and universal primary enrolment of children in ages 6-11, vocationalisation of second level education and providing part-time and correspondence courses.
(2) through the allocation of money for the development of education in order to achieve the objectives laid down in the Plan.

National Accounts and Planning for Economic Growth

The National Accounts for a country are compiled by the Central Statistical Office of that country. Thus for India C.S.O. compiles the National Accounts and for every State in India estimates of their income are made. Since these accounts are compiled annually, progress of the economy can be evaluated through them and targets can be laid down for the Plans. Thus the annual growth of the economy is expressed as a percentage of gross national product. When the GNP is divided by the total size of the population of the country, per capita income of per capita GNP is available. When the changes in prices that have taken place over a period of time are taken out, then we can get at the growth of per capita real income. Economic growth can be defined as a sustained growth of per capita real income.

As has already been explained in the earlier Chapter, GNP is the value expressed in money of the goods and services produced in a year in a country. Such productive activities lead to material goods like wheat or cloth or services like transport or education. The National Accounts of Western countries distinguish between productive services like transport and other services like health and education. The term production is used to include material goods and productive services like transport while product includes material goods, productive services and other services. Thus the concept of product is wider than production. (Attention is invited to the difference in the concepts of GNP at market prices, constant prices, gross domestic product, gross national product at factory cost and net national product which have been explained in the earlier Chapter). Table II gives the net National Product at factor cost for India for 1960-61 to 1968-69.

Sectors of Economic Activities

GNP is the sum of the money value of all the activities that take place in the different sectors of economic activity. The United Nations has classified all the activities taking place in any country into nine divisions and each is denoted by a digit. This is called a single digit classification. Every country has adopted the international classification to its own requirements. In India C.S.O. has adopted a National Industrial Classification as given below:

0 Agriculture, hunting, forestry and fishing.
1 Mining and quarrying.

2 & 3 Manufacturing.
4 Electricity, gas and water.
5 Construction.
6 Wholesale and retail trade restaurants and hotels.
7 Transport, storage and communication.
8 Financing, insurance, real estate and business services.
9 Community, social and personal services.
X Activities not adequately defined.
Y Repair services.

In each of the above classifications there are further classifications and they have now been made up to four digits. It is proposed to use the classification up to four digits for 1971 Census of India.

Table II

Comparison of Movement of Net National Product at Factor Cost at Current and Constant Prices

Item	1960-61^+	1961-62^+	1962-63^+	1963-64^+	1964 65^+	1965-66^+	1966-67^+	1967-68^+	1968-69^+
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Net National Product (Rs. crores*)									
1. at current rates	13294	14050	14873	17094	20061	20621	23624	28356	28583
2. at 1960-61 prices	13294	13763	14045	14845	15917	15021	15123	16586	16943
Per Capita Net Product (Rs. †)									
3. at current prices	306·4	316·4	326·4	366·4	419·8	421·2	470·8	551·4	542·3

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
4. at 1960-61 prices	306·4	310·0	308·3	318·2	333·1	306·8	301·4	322·5	321·4
Index Number of Net National Product with 1960-61 as base									
5. at current prices	100·0	105·7	111·9	128·6	150·9	155·1	177·7	213·3	215·0
6. at 1960-61 prices	100·0	103·5	105·6	111·7	119·7	113·0	113·8	124·8	127.4
Index Number of Per Capita Net National Production with 1960-61 as base									
7. at current prices	100·0	103·3	106·5	119·6	137·0	137·5	153·7	180·0	177·0
8. at 1960-61 prices	100·0	101·2	100·6	103·9	108·7	100·1	98·4	105·3	104·9

+ Provisional

* crore = 10 million

† The implicit estimates of population exclude the population of (i) Dadra and Nagar Haveli (ii) Goa, Daman and Diu, and (iii) Pondicherry in 1960-61 and of (ii) and (iii) in 1961-62.

Thus under agriculture, forestry and fishing the following five activities are recognised at the two digit level of classification :

0 Agriculture, forestry, fishing.
00 Agricultural production.
01 Plantations.
02 Livestock production.
03 Agricultural services.
04 Hunting, trapping and game propagation.
05 Forestry and pegging.
06 Fishing.

Further under each activity at the level of 2 digits, 3 digits classification is adopted. Similarly for each level at 3 digits a four digit classified activities are spelt out.

Classification of Occupations

The I.L.O. published in 1968 an international standard classification of occupations. The D.G.E.T. has put out a national classification of occupations. The following is the national classification of occupations at the level of one digit.

Divisions

0—1 Professional, technical and related workers.
2 Administrative, technical and managerial workers.
3 Clerical and related workers.
4 Sales workers.
5 Farmers, fishermen, hunters, peggers and related workers.
6 Service workers.
7, 8 & 9 Production and related workers, transport equipment operators and labourers.
X Workers not classified by occupation.

These classifications will be in use in 1971 census.

When these aspects are considered it may be noted that they all have economic implications. The stock of manpower can be considered in relation to the economy and in particular the stock of physical capital or what is called capital formation. It can be examined whether there is good combination of the stock of both kinds of capitals.

Table III shows the contribution made to national income of India by the different Sectors of economic activity. Table IV shows the net domestic product for the different states of India prepared by C.S.O.

Techniques of Projecting National Accounts

The techniques of projecting National Accounts are really the techniques of forecasting the way in which the economy of a country is likely to grow in future. We shall illustrate the problems in projecting future economic growth on the basis of the following table which shows the projection of net domestic product and expenditure for 1968-69 to 1980-81. (Table V at Page 44.)

In Table V, items 4, 5 and 6 show the different ways in which the national product is to be spent—either on investment or consumption. The requirement of consumption has to be met but investment facilitates future consumption and the problem in planning is to decide how much is to be spent on consumption at present and how much has to be provided for future consumption, *i.e.*, investment.

The amount of investment that could be undertaken depends upon the saving that an economy can do. The rate of domestic saving in India in 1968-69 was 8·8% and it is proposed

Table III

Net Domestic Product at Factor Cost by Industry of Origin Percentage Distribution

Industry	1960-61^{+}	1961-62^{+}	1962-63^{+}	1963-64^{+}	1964-65+	1965-66^{+}	1966-67^{+}	1967-68^{+}	1968-69
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1. Agriculture	51·0	49·9	48·0	48·6	50 5	47·8	49·6	53·2	50·4
2. Forestry & logging									
3. Fishing									
4. Mining & quarrying.									
5. Large-scale manufacturing	20·1	20·6	21·4	21·5	20·3	21·1	19·8	17·2	19·2
6. Small-scale manufacturing									
7. Construction ; and									
8. Electricity, gas and water supply									

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
9. Transport and communication railways Communication transport by other means ; and	14·0	14·3	14·8	14·5	14·5	15·2	15·5	15·0	15·4
10. Trade, storage, hotels, restaurants									
11. Banking and Insurance									
12. Real estate and Ownership of Dwellings									
13. Public Administration and defence ; and									
14. Other Services	14·9	15·2	15·8	15·4	14·7	15·9	15·1	13·9	15·0
Total : net domestic produsct	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0

+ Povisional.

Table IV

Estimates of total and per capita net domestic product for different States as prepared and published/cleared for publication by the respective State Governments

State	*Current/ constant prices*	*Year*	*Estimates of net domestic product*	
			Total (Rs. crores)	*per capita* (Rs.)
(1)	(2)	(3)	(4)	(5)
Andhra Pradesh	Current	1967-68		
		1966-67	1798·18	449
		1965-66	1543·03	393
		1964-65	1530·76	397
		1963-64	1366·70	362
		1962-63	1181·33	319
		1961-62	1101·78	303
		1960-61	998·29	279
	Constant (*base : 1960-61*)	1967-68		
		1966-67	1167·34	291
		1965-66	1097·98	280
		1964-65	1225·33	318
		1963-64	1168·98	309
		1962-63	1100·64	297
		1961-62	1071·29	295
		1960-61	998·29	279
Assam	Current	1968-69	810·40	556
		1967-68	790·60	558
		1966-67	689·30	500
		1965-66	560·90	418
		1964-65	513·80	394
		1963-64	453·40	357
		1962-63	399·00	323
		1961-62	393·30	327
		1960-61	363·50	311
		1955-56	274·00	274

(1)	(2)	(3)	(4)	(5)
	Constant (*base : 1948-49*)	1968-69	410·80	282
		1967-68	396·00	279
		1966-67	374·20	271
		1965-66	369·90	276
		1964-65	363·50	279
		1963-64	343·70	271
		1962-63	314·50	255
		1961-62	318·90	266
		1960-61	296·20	254
		1955-56	267·90	268
Bihar	Current	1967-68	2044·79	399
		1966-67	1511·95	294
		1965-66	1628·93	323
		1964-65	1403·56	283
		1963-64	1190·87	245
		1962-63	1061·39	222
		1961-62	997·33	212
		1960-61	948·13	206
		1955-56	659·29	150
	Constant (*base : 1948-49*)	1967-68	1007·30	192
		1966-67	876·06	170
		1965-66	1019·94	202
		1964-65	1043·31	210
		1963-64	1001·33	206
		1962-63	975·13	204
		1961-62	945·64	201
		1960-61	914·45	198
		1955-56	685·94	156
Gujarat	Current	1967-68	1301·00	529
		1966-67	1121·00	468
		1965-66	969·94	417
		1964-65	971·16	429
		1963-64	836·03	380

(1)	(2)	(3)	(4)	(5)
Guajrat	Current	1962-63	753·94	351
		1961-62	750·61	359
		1960-61	693·91	339
		1955-56	473·48	259
	Constant (*base* : *1960-61*)	1968-69	821·00	325
		1967-68	896·84	364
		1966-67	812·88	340
		1965-66	791·01	340
		1964-65	836·61	369
		1963-64	776·02	353
		1962-63	754·41	351
		1961-62	756·66	362
		1960-61	693·91	339
		1955-56	571·82	313
Jammu and Kashmir	Current	1955-56	67·97	216
	Constant (*base* : *1955-56*)	1968-69	118·38	299
		1967-68	111·87	288
		1966-67	106·57	280
		1965-66	95·02	255
		1964-65	94·83	259
		1963-64	92·69	258
		1962-63	91·27	259
		1961-62	89·00	257
		1960-61	86·04	253
		1955-56	67·97	216
Haryana	Current	1967-68	629·50	678
		1966-67	530·05	589
		1965-66	390·27	447
		1960-61	253·43	337

(1)	(2)	(3)	(4)	(5)
	Constant (*base* : *1960-61*)	1967-68	357·85	386
		1966-67	298·13	331
		1965-66	271·55	311
		1960-61	253·43	337
Kerala	Current	1967-68	1002·10	505
		1966-67	886·76	457
		1965-66	766·01	404
		1964-65	665·10	359
		1963-64	577·51	320
		1962-63	527·69	300
		1961-62	488·59	285
		1960-61	461·98	276
		1955-56	322·00	215
	Constant (*base* : *1960-61*)	1967-68	589·53	297
		1966-67	561·37	289
		1965-66	538·99	284
		1964-65	527·99	285
		1963-64	510·66	283
		1962-63	485·19	276
		1961-62	467·60	272
		1960-61	461·98	276
		1955-56	395·29	264
Madhya Pradesh	Current	1968-69	1846·30	473
		1967-68	1921·50	505
		1966-67	1453·80	392
		1965-66	1276·60	352
		1964-65	1378·30	390
		1963-64	1168·30	339
		1962-63	1035·90	308
		1961·62	1025·20	312
		1960-61	923·90	288
		1955-56	643·50	224
		1950-51	550·50	213

(1)	(2)	(3)	(4)	(5)
	Constant (*base* : *1952-53*)	1968-69	973·10	250
		1967-68	1001·70	263
		1966-67	810·60	218
		1965-66	825·00	228
		1964-65	921·20	261
		1963-64	862·10	250
		1962-63	813·30	242
		1961-62	837·40	255
		1960-61	834·30	260
		1955-56	674·00	234
		1950-51	510·30	198
Maharashtra	Current	1968-69	3329·81	696
		1967-68	3155·81	676
		1966-67	2758·96	606
		1965-66	2354·48	531
		1964-65	2266·30	524
		1963-64	2036·90	483
		1962-63	1812·45	441
		1961-62	1647·34	411
		1960-61	1597·42	409
	Constant (*base*: *1960-61*)	1968-69	2005·46	419
		1967-68	1926·16	412
		1966-67	1793·71	394
		1965-66	1704·06	384
		1964-65	1767·08	409
		1963-64	1712·24	406
		1962-63	1643·22	400
		1961-62	1595·69	398
		1960-61	1597·42	409
Mysore	Current	1968-69	1360·29	500
		1967-68	1240·74	464
		1966-67	1122·04	428
		1965-66	1011·81	393

(1)	(2)	(3)	(4)	(5)
Mysore	Current	1964-65	973·41	385
		1963-64	871·46	351
		1962-63	744·76	306
		1961-62	708 21	297
		1960-61	667·40	285
		1956-57	495·17	230
	Constant (*base*: *1956-57*)	1968-69	796·93	293
		1967-68	750·21	281
		1966-67	697·60	266
		1965-66	636·82	247
		1964-65	646·55	256
		1963-64	626·12	252
		1962-63	598·97	246
		1961-62	576·32	242
		1960-61	555·91	238
		1956-57	495·17	230
Orissa	Current	1963-64	561·40	304
		1962-63	492·65	273
		1961-62	443·69	253
		1960-61	428·91	249
		1955-56	315·23	199
	Constant (*base*: *1960-61*)	1963-64	516·23	280
		1962-63	472·86	262
		1961-62	440·70	251
		1960-61	428·91	249
		1955-56	362·43	229
Erstwhile Punjab	Current	1964-65	1277·50	576
		1963-64	1043·30	483
		1962-63	877·80	416
		1961-62	825·80	401
		1960-61	779·80	388
		1955-56	590·40	330
		1952-53	537.70	321

(1)	(2)	(3)	(4)	(5)
	Constant (*base* : *1952-53*)	1964-65	875·90	395
		1963-64	792·90	367
		1962-63	754·00	357
		1961-62	736·60	358
		1960-61	718·40	357
		1955-56	626·20	350
		1952-53	537·70	321
Reorganised Punjab	Current	1967-68	1126·80	828
		1966-67	991·30	751
		1965-66	780·60	610
		1960-61	N.A.	382
	Constant (*base* : *1952-53*)	1967-68	635·30	467
		1966-67	577·50	438
		1965-66	532·10	416
Rajasthan	Current	1968-69	992·33	419
		1967-68	1150·01	497
		1966-67	996·59	441
		1965-66	841·47	381
		1964-65	832·75	386
		1963-64	689·57	326
		1962-63	687·97	333
		1961-62	676·43	336
		1960-61	626·47	318
		1955-56	456·11	260
		1954-55	400·19	233
	Constant (*base* : *1954-55*)	1968-69	585·23	247
		1967-68	625·95	270
		1966-67	557·79	247
		1965-66	533·00	241
		1964-65	532·26	246
		1963-64	490·75	232
		1962-63	503·88	244

(1)	(2)	(3)	(4)	(5)
	Constant (*base* : *1954-55*)	1961-62	496·93	247
		1960-61	467·06	237
		1955-56	413·17	236
		1954-55	400·19	233
Tamil Nadu	Current	1968-69	2096·02	543
		1967-68	2094·20	551
		1966-67	1911·37	512
		1965-66	1598·94	437
		1964-65	1497·31	416
		1963-64	1370·98	387
		1962-63	1256·95	361
		1961-62	1214·75	354
		1960-61	1129·56	335
		1955-56	769·00	241
	Constant (*base* : *1960-61*)	1968-69	1446·04	375
		1967-68	1448·94	381
		1966-67	1387·35	372
		1965-66	1291·57	353
		1964-65	1275·57	354
		1963-64	1245·17	352
		1962-63	1212·77	348
		1961-62	1184·53	345
		1960-61	1129·56	335
		1955-60	963·54	302
Uttar Pradesh	Current	1967-68	4242·60	498
		1966-67	3526·03	423
		1965-66	2965·95	364
		1964-65	2961·41	372
		1963-64	2247·91	288
		1962-63	1988·91	261
		1961-62	1913·67	257
		1960-61	1799·31	246

(1)	(2)	(3)	(4)	(5)
	Constant (*base* : *1960-61*)	1968-69	2159·39	248
		1967-68	2088·73	245
		1966-67	1897·67	228
		1965-66	1996·29	245
		1964-65	2055·54	258
		1963-64	1843·91	237
		1962-63	1837·90	241
		1961-62	1839·03	247
		1960-61	1799·31	246
West Bengal	Current	1968-69	2265·54	547
		1967-68	2162·30	533
		1966-67	1791·49	452
		1965-66	1564·44	403
		1962-63	1231·78	340
		1961-62	1160·28	328
		1960-61	1099·05	319
		1955-56	765·26	267
	Constant (*base* : *1951-52*)	1968-69	1382·11	334
		1967-68	1386·79	342
		1966-67	1306·83	329
		1965-66	1280·31	330
		1964-65	1282·34	338
		1963-64	1209·02	326
		1962-63	1148·78	317
		1961-62	1100·86	311
		1960-61	1106·66	321
		1955-56	847·93	296
		1951-52	731·27	274
Himachal Pradesh	Current	1965-66	65·09	389
		1964-65	62·71	396
		1963-64	56·29	373
		1962-63	48·62	337
		1961-62	55·02	398
		1960-61	47·81	359

(1)	(2)	(3)	(4)	(5)
Himachal Pradesh	Current	1955-56	30·21	258
		1950-51	26·49	240
	Constant (*base* : *1950-51*)	1966-67	44·65	252
		1965-66	40·20	240
		1964-65	41·96	265
		1963-64	39·34	261
		1962-63	36·15	251
		1961-62	38·84	281
		1960-61	35·16	264
		1955-56	28·39	243
		1950-51	26·49	240
Manipur	Current	1965-66	30·07	324
		1964-65	22·91	257
		1963-64	19·97	232
		1962-63	16·12	195
		1961-62	14·86	187
		1960-61	14·78	192
	Constant (*base* : *1960-61*)	1965-66	19·93	215
		1964-65	16·30	182
		1963-64	15·87	185
		1962-63	14·75	178
		1961-62	14·23	179
		1960-61	14·78	192
Tripura	Current	1966-67	58·86	412
		1965-66	49·15	353
		1964-65	45·02	332
		1963-64	40·15	306
		1962-63	37·13	309
		1961-62	36·30	310
		1960-61	30·67	269
		1955-56	19·57	228

N.B. : Owing to the difference in concepts, methodology and source material used, the figures for different states are not strictly comparable.

Table V

Projection of Net Domestic Product and Expenditure
1968-69 to 1980-81
Rs. 100 Crores at 1968-69 (*price*)

ITEM	1968-69	1973-74	1978-79	1980-81	Index of growth 1980-81 over 1968-69
1	2	3	4	5	6
1. Net domestic product at factor cost	290·7	383·1	517·0	582·2	200
2. Net domestic product at market price	317·6	418·6	571·0	644·4	203
3. Net imports of goods and services	3·1	2·3	(−)1·0	(−)2·0	—
4. Net domestic expenditure	320·7	420·9	570·0	642·4	200
5. Of which : net investment	32·3	55·0	86·2	102·5	317
6. Government consumption	31·0	41·0	55·0	62·0	200
7. Private consumption	257·4	324·9	428·8	477·9	186
8. Per capita private consumption	488	545	644	693	143

to raise it to 13·2% in 1973-74. The investment in 1968-69 was11·3% of national income and in 1973-74 it is expected to raise to 14·5%. In projecting the future growth of the economy another important factor that has to be taken into account is the possibility of the rate at which every sector of the economy can grow. We shall illustrate this problem with the help of the following simple example.

Suppose the GDP originates from the different sectors as in the following way :

Agriculture	50%
Manufacture	15%
Services	35%
Total	100

Suppose agriculture has grown at 3% per annum, manufacture at 10% per annum and services at 4·9% per annum, then the following table shows the position as a result of the growth in absolute terms :

Agriculture	1·5
Manufacture	1·5
Services	1·7
Total	4·7

The above represents an increase of 4·7% per annum. It may be noted that for a 4·7% rate of growth of GDP, 3% rate of growth of GDP, from agriculture is needed. Since agriculture is the major sector of economic activity the higher the rate at which agriculture can grow the higher will be the rate at which GDP can grow.

Data Needed for Projecting National Accounts

Planning for economic development is done in the langauge of national accounts. It will be of advantage for the educational planners to be able to project future national accounts so that it will be possible for them to know the likely resources available for education. It will also be possible for them to know the kind of education in terms of quantity for promoting economic growth. The following data are needed for this purpose :

(1) The gross national income.
(2) Its origin from different sectors of economic activity.
(3) The targets of economic development—in terms of annual rate of growth of gross domestic product, employment and the productivity.

Sources of the data

The above data are the minimum that are needed for projecting national accounts. The pattern of growth is determined by many factors in which the capital available for the economy is an important one. But the educational planners need not go into the question of capital accumulation and the capacity of the economy to save because he is interested only in the structure of the economy that is likely to result after investment has been made. The following table shows the position regarding the contribution made by different sectors to gross domestic product for the years 1964-68 (the data are hypothetical).

Table VI

Gross Domestic Product at Factor Cost*

(*in units of a country's currency*)

	1964	1965	1966	1967	1968	*Average change per year*
Agriculture	1305	1346	1352	1399	1440	+ 2·5
Manufacturing	559	632	716	823	972	+14·8
Services	479	486	494	505	514	+ 1·8
Total	2343	2464	2562	2727	2926	+ 5·7

Source : This information will be available from the Central Statistical Organisation of a country. For individual States in a country, *e.g.*, in India there may be Bureau of Economics & Statistics.

*Constant prices 1964-68.

The position regarding the employment of persons in different sectors of the economy is given in the following table. This information will be available from the office of the Census for a country or from the Central Statistical Organisation. Since this information may be available only for the census years, for other years, a survey may have to be made for this purpose. In some of the developing countries there is also a non-monetized sector from which contribution to national income is made *i e.*, sector where money is not generally used. This is generally the case in remote rural areas which is also called non-organised sector of the money market in a country like India. The size of this sector of the economy is not very large. The following table shows the position regarding employment of the persons in different sectors for the same hypothetical country :

Table VII

Employment of Persons by Sector 1966-68

Sector	1964	1965	1966	1967	1968	*Average annual change*
Agriculture	264·4	269·1	265·1	269	271·8	+ ·5
Manufacturing	17·8	18·2	18·3	19	20·3	+3·3
Services	53·8	54	54·3	54·9	55·3	+ ·7
Total monetary sector	338	341·3	337·7	342·9	347·4	+ ·7
Non-monetized sector				1574·6		

Targets for the Development for the Period 1969-78

The targets for the development of the economy are given in the plan of the country under consideration. It will usually have targets of aggregate growth rate of gross domestic product, sectoral rates of growth, aggregate employment growth and sectoral employment growth. The table given in the next page shows the targets for the year 1969-78.

Table VIII

Development Targets : 1969-78

(Growth Rate per year)

Sector	*G.D.P.*		*Productivity*		*Employment*	
	1969 to 1973	1974 to 1978	1969 to 1973	1974 to 1978	1969 to 1974	1974 to 1978
Agriculture	+3·2	+3.7	+2	21	1·2	1·6
Manufacturing	15	17	11·3	11·5	3·3	4·9
Services	2·3	2·5	1·1	1·1	1·2	1·4
Total	7·6	10·5	6·2	8·6	1·3	1·8

It has to be mentioned that these targets are laid down on the basis of a strategy for development that has been adopted by the country concerned. In some cases, only the growth of gross domestic product will be given because only they are regarded as specific targets. Employment and productivity may not enter into targets as specified targets laid down in quantity because of the difficulties of defining precisely the term employment and unemployment (recently an Expert Committee has reported on the definition to be used in India).

On the basis of the targets that have been given in the plan, the following two tables give the gross domestic product by sector for the period 1969-78 and the projected growth of employment by sector for the hypothetical country. (Tables VII & VIII.)

4

Setting up Targets for Enrolment on the Basis of the Manpower Required for Economic Growth

In this chapter we shall discuss the methods of projecting the manpower required for economic growth so that it can be set up as one of the targets for attainment in educational planning. No country can afford to set up its targets for enrolments on the basis of the manpower requirements for economic growth alone. There are other objectives like the demand for education on the part of the people irrespective of whether that kind of manpower is needed by the economy or not. Besides, manpower planning for economic growth is likely to be full of all kinds of uncertainties on account of the difficulty of predicting accurately the future trend of the economy. Robbins committee in the U.K. regarded the difficulties of manpower projections so serious that they were not prepared to be guided by them while recommending the enrolments in the higher education. Instead they relied upon the expected social demand for higher education.

In countries like India where there is a surplus of labour and unemployment which is both disguised and open, the projections of manpower are likely to go wrong because of several other considerations which will be referred to later in this chapter.

All these considerations make it necessary for the educational planner to be aware of the major elements of manpower planning, the techniques of projections and their limitations though he himself may not be called upon to do manpower planning.

Genesis of Manpower Planning

Manpower planning became an important activity in the period after the second World War in the wake of the realisation that the growth of National Income was rendered possible by an unknown factor which was called "Residual factor"* and the rapidity with which technology was changing which made the training that any worker had obsolete very soon.

In the developing countries like India also manpower planning came to be adopted more or less on the same lines on which it was done in the developed countries. In both the cases the assumption was made that the skills needed for promoting economic development are likely to be in short supply and hence expansion of education should take place to prevent such a shortage.

Steps in Manpower Planning for Economic Growth

For estimating manpower required for economic growth of a country different methods have been followed. Six countries of the Mediterranean Region entered into an agreement with the organisation for Economic Co-operation and Development and a project called "Mediterranean Region Project" was undertaken in which manpower required for economic growth of each of the countries (Turkey, Greece, Spain, Portugal, Italy and Yugoslavia) for a period beginning from 1961 to 1975 was estimated. The following were the steps in that methodology.

(1) The targets for the growth of output per worker adopted in the plans of each of the countries were adopted.

(2) The employment in each sector like agriculture, industry and services was estimated for the final year of the plan. The employment of the population in the target year would depend on some factors which are predictable while others may not.

  (*a*) Demographic changes like changes in the age structure of the population.

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*Residual factor in economic growth—O.E.C.D.

(*b*) Social objectives like reduction in the unemployment in a country.

(*c*) Spontaneous changes in the supply of labour resulting in changes in participation ratio by the labour force.

(3) The structure of output in the target year—how much will originate in agriculture, in industry and services—was estimated. This is the essence of economic growth and therefore, only rough assumptions could be made on the basis of past trends and present patterns of output and employment and the changes in the structure of output required to meet the economic and social objectives of the plans of every country.

(4) Both in the base year and the final year of the plan the population in every sector was divided on the basis of their occupations and educational qualifications.

(5) Estimates were made of the retirement from the labour force and the consequent need for replacement in the period of the plan.

(6) The difference between the stock of manpower for the year 1975 and the stock existing in 1961 was the addition to be made to the manpower by the educational system.

(7) The additional manpower needed was converted into enrolments year by year and the teachers, buildings, etc., required were marked out.*

A look at the methodology adopted by the MRP shows that there are two essential aspects of the planning which can be recognised by the educational administration.

(*a*) Estimating the occupational composition of the labour force in the target year ;

(*b*) Estimating the educational qualifications of each occupation.

We have already referred in the earlier chapter of the classification of the population by occupations adopted by International Labour Organisation. In estimating the future occupations that will come into being when the economic plan gets implemented, one should know the relationship between the evolution of occupations and economic growth. For this purpose it will be worthwhile studying the manner in which occupations have grown in the past when the growth of the economy has taken place, *i.e.*, have new occupations came into being, if so, how many, etc. ? These are some of the problems in identifying the occupational structure of the labour force.

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*An experiment in planning by six countries—MRP Project by OECD —p. 13.

The educational planner will be interested in knowing how the levels of education in each occupation have changed in the past and what lessons it has to offer in projecting future relationship between education and occupations. In particular the educational planner would like to know how the level of education of the persons is related to the productivity and in what manner productivity changes result in or call for changes in education. In the light of this knowledge the educational planning can be done for optimal level of education needed for economic growth in respect of each occupation. Even when the optimal level of education is known the planner can decide in what way the education is to be given—is it by organising specific on the job training or by introducing courses in the formal education system.

Manpower Planning in India, Organisational Arrangements

At the level of the Central Government the following institutions and divisions are concerned with manpower planning in India : (1) The Institute of Applied Manpower Research, (2) the Manpower Directorate in the Ministry of Home Affairs, (3) the Cabinet Committee on Manpower, (4) Director General of Employment and Training, Ministry of Labour, (5) Council of Scientific and Industrial Research, and (6) Employment Division of Planning Commission.

At the State level, certain officers have been designated as State Manpower Officers, who participate in Manpower Planning through the General Council of the Institute of Applied Manpower Research. These officers are generally from the planning departments of the State Governments. In manpower planning in India certain categories of manpower like doctors and para medical personnel, agricultural and engineering professionals have received more attention than degree holders or matriculates.

Methods of Estimating Manpower Requirements

We have referred already to the method adopted by MRP in estimating manpower for economic growth. Such a method has presumed that the estimating of manpower required for economic growth is the only way of linking up education with the needs of the economy. This is not found to be true. There is need for a more general method for estimating manpower requirement for economic growth and linking up education with the needs of the economy. In fact, these two are separate though connected issues. We may take the latter first. Integrating education with economic requirements implies not merely providing the facilities in the educational system for training the required manpower but also integrating it financially with the economy, *i.e.*, in terms of the percentage of GNP spent on education as well as of the budget and the unit cost for every level of education. This aspect of the integration will be discussed in a later chapter.

General Methods of Manpower Estimation

The object of manpower planning is mainly to estimate the manpower required in every sector of the economy. But the approach for the estimation can be macro, *i.e.*, for the economy as a whole or micro, *i.e.*, for individual sectors like engineering manpower. In the method adopted by MRP, the approach was micro. It will be helpful to make use of supply and demand analysis in estimating the demand for manpower in any economy. The supply of manpower is due to :

(*a*) the new entrants into the labour force from the educational system.

(*b*) re-entry or delayed entry.

(*c*) in-migration.

(*d*) occupational mobility.

During the period of a plan withdrawals take place from the manpower on account of :

(1) mortality
(2) retirement
(3) pre-retirement
(4) out-migration
(5) occupational mobility.*

In order to forecast manpower demand in any sector, we should isolate an accurate measure of activity in that sector and then determine the relationship between the level of activity and the manpower required for that activity. The level of activity is the independent variable. The relationship between these two variables is called a manpower ratio, *i.e.*, the amount of activity of a given kind that can be handled by a single man with given qualifications.

$$\text{Ratio } r = \frac{\text{unit activity}}{\text{man}}$$

Suppose one design engineer is able to handle in one year Rs. 10000/- worth of new road design then the ratio for design engineer is 10000 : 1.

Generally two kinds of independent variables have been used in manpower planning : (1) Economic variables like the investment, output or employment ; and (2) social variables like the doctor population ratio. The following table shows the activities in the different sectors and the economic and social variables that could be chosen.

Sector	*Economic variables*	*Social*
1. (*a*) Construction (Capital)	$\frac{\text{Expenditure}}{\text{man}}$	
(*b*) Construction (recurrent)	,,	
2. Agriculture		
(*a*) Extension		Extension $\frac{\text{Workers}}{\text{farm family}}$

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*Dr. S. P. Agarwal—*Supply of Manpower.*

Sector	*Economic variables*	*Social*
(*b*) Crops	$\frac{\text{Man}}{\text{acre}}$	
3. Education		$\frac{\text{Student}}{\text{Teacher}}$
4. Industry	$\frac{\text{Expenditure}}{\text{man}}$	
5. Health	$\frac{\text{Unit production}}{\text{man}}$	$\frac{\text{Man}}{\text{unit population}}$
6. Commerce	$\frac{\text{Unit value}}{\text{man}}$	

We shall illustrate with the help of the data for Thailand the steps in projecting the manpower required and converting it into enrolments with the help of the data for Thailand.

(1) The Economic and Social Development Plan of Thailand—1967-71.

This plan gives the expectation in regard to economic growth envisaged in the plan. This has to be converted into manpower and employment targets on the basis of which decision can be taken for increasing the enrolments in the educational system.

The following steps are required :

(1) Estimating the additional employment likely to result from the implementation of the plan and their distribution among the different sectors of economic activity.
(2) Estimating the supply of manpower from the educational system.
(3) Estimating the requirements of manpower ; both at the macro and micro level.
(4) Estimating the difference in the number of persons employed in each occupation between 1966 and 1971, *i.e.*, additional manpower required.

In addition, other factors also influence the demand for manpower. They are :

(1) alteration from labour force due to death, retirement and other causes.
(2) current manpower shortages.
(3) modernisation of employment structures.

How to Estimate the Additional Employment Resulting from a Plan ?

The following steps are needed :

(1) Calculate the GDP per worker in every sector (above 15 yrs.)
(2) Project the GDP per worker in 1966 on the assumption of productivity increase of 2·5% per annum in agriculture, commerce and services, 3% in transport, communications and other sectors in the plan. Applying these figures to 1966 GDP, the number of workers in that year was worked out. It came to 14·5 million.

Method of Estimating the Additional Employment Resulting from the Plan

The following were the steps in calculating the employment resulting from the plan.

(1) The GDP per worker—a person above 15 years—was calculated for every sector. Table VI shows the GDP per worker in every sector.
(2) GDP in 1966 was projected on the assumption of productivity increase of 2·5% per annum in agriculture, commerce and services, 3% in transport, communications and other sectors in the plan. Applying these figures to 1966 GDP, the number of workers in 1966 was worked out which came to 14·5 million.
(3) The GDP per worker in 1971 was projected on the assumption of productivity increases at 2·5% per annum in agriculture, 3% in commerce and services and 3·5% in manufacturing, transport and communications. Applying these figures to the GDP estimate for 1971, the number of workers in different sectors

was obtained and the total was 16·7 million.

The assumption of the increase in productivity is most crucial to the plan and that is the most important aspect of the process of planning for economic growth.

(4) The next step is to estimate the supply of manpower from the existing educational system during the plan period. It will be useful to make separate estimates of the output from the universities by their fields of specification.

Estimates of the Manpower Requirements during the Plan Period

The employment estimates made for the individual sectors of the economy for 1966 and 1971 were translated into major occupational groups on the basis of the occupational pattern of employment revealed by a labour force survey conducted in 1963 and subsequently into unit occupational groups on the basis of the occupational pattern, revealed by the population census of 1960. (Tables VII, VIII, IX and X give the percent distribution of workers by industry and occupational groups and the number of persons employed in 1966 and 1971.

Table IX

GDP per Worker in 1960

Industrial Origin	1960		
	GDP (million bahts)	No. of workers	GDP per worker (2) ÷ (3)
(1)	(2)	(3)	(4)
1. Agriculture	22,818·6	10,341,857	2,206·4
2. Mining and Quarrying	836·3	28,443	29,402·7
3. Manufacturing	6,880·2	454,807	29,402·7
4. Construction	2,231·4	68,260	15,127·7
5. Electricity & Water Supply	241·3	15,454	32,689·7
6. Transport & Communication	3,913·3	164,142	15,614·1
7. Trade and Commerce	14,631·5	744,424	23,840·9
8. Services	8,009·2	643,595	19,654·8
Total	59,561·8	12,460,982	12,444·5

Table X

Employment in Thailand+

Economic Sector	1954[1]	1960[2]	1966[3]	1971[4]
Agriculture	8,971,600	10,341,857	11,618,752	12,675,498
Mining & Quarrying	19,200	28,443	41,486	51,322
Manufacturing	212,520	454,807	689,134	982,143
Construction	28,440	68,260	110,687	164,247
Electricity, Gas, Water, etc.	4,680	15,454	33,249	57,548
Transport and Communication	84,520	164,142	228,949	324,830
Commerce	463,240	744,424	1,027,574	1,368,792
Services	393,080	643,595	804,304	1,139,818
Total	10,177,280++	12,460,982++	14,554,135	16,764,198

+Relates to persons aged 15 years and over.

++This figure does not include the small number of persons unclassified.

[1] 1954 Demographic and Economic Survey.

[2] 1960 Census.

[3] & [4] Estimated.

Table XI

Number of University Graduates likely to pass out during the Second Plan Period

(*Source* : National Education Council
and Education Division of NEDB)

Field of Study	University	No. of Graduates					
		1967	1968	1969	1970	1971	Total
1. Humanities							
Arts	Chulalongkorn	150	160	160	160	200	830
Archaeology	Silpakorn	20	20	20	20	20	100
Liberal Arts	Thammasart	80	100	120	140	160	600
Humanity	Chieng Mai	—	77	104	150	200	531
Arts & Science	Kasetsart	—	—	—	—	50	50
2. Education							
Education	Chulalongkorn	150	250	400	450	500	1750
Education	Education (Prasarnmit)	695	848	1055	1250	1433	5281
3. Fine Arts							
Architecture	Chulalongkorn	70	70	80	80	90	390
Thai Architecture	Silpakorn	30	30	30	35	35	160
Painting & Sculpture	,,	10	20	20	20	20	90
Decorative Arts	,,	20	25	30	30	30	135
4. Social Sciences							
Political Science	Chulalongkorn	170	310	230	245	250	1135
—do—	Thammasart	120	120	120	120	120	600
Law	,,	900	750	700	220	950	4200
Social Administration	,,	300	350	200	220	240	1130
Commerce & Accountancy	Chulalongkorn	240	260	300	335	355	1490
—do—	Thammasart	443	352	296	439	460	2090
Economic & Business Admn.	Kasetsart	87	84	83	103	106	463
Economics	Thammasart	250	250	250	250	250	1250

Field of Study	University	No of Graduates					
		1967	1968	1969	1970	1971	Total
Mass Communication	Chulalongkorn	—	—	50	80	81	210
5. Science							
Science	Chulalongkorn	150	150	250	300	400	1250
,,	Chieng Mai	—	63	91	150	160	464
6. Engineering							
Engineering	Chulalongkorn	250	250	300	300	300	1400
,,	Kasetsart	30	30	40	40	40	180
,,	Khonkaen	—	—	45	100	165	310
7. Medical Science							
Medicine	Siriraj	120	120	120	120	120	600
,,	Chulalongkorn	80	80	80	80	80	400
,,	Chieng Mai	50	50	50	70	80	300
,,	Ramatibodi	—	—	—	—	50	50
Dentistry	Med. Science	50	50	60	60	80	300
Med. Technology	—do—	60	70	90	90	130	440
Veterinary Science	Kasetsart	25	25	30	30	40	150
Pharmacy	Med. Science	120	120	120	120	120	600
Medical Sciences	,,	50	50	50	50	50	250
Sanitation Sciences	,,	30	80	80	85	85	360
Tropical Medicine	,,	12	12	12	12	12	60
Nursing (Degree)	,,	10	10	10	10	10	50
8. Agriculture							
Agriculture and Husbandry	Kasetsart	200	200	200	200	300	1100
Forestry	Kasetsart	50	50	50	70	100	320
Fisheries	Kasetsart	25	25	30	30	40	150
Agriculture and Husbandry	Chieng Mai	—	6	29	60	60	155
—do—	Khonken	—	—	35	65	100	200

Table XII

Per cent Distribution of Workers by Industry and Occupational Groups

Occupational group	Mining & Quarrying	Manufacturing	Construction	Electricity, Gas etc.	Trade & Commerce	Transport & Communication	Services
1. Profession	16·0	1·4	3·6	13·4	0·6	0·8	21·3
2. Administrative	—	1·9	0·9	5·0	1·6	2·3	4 4
3. Clerical	16·0	3·9	2·0	18·2	5·1	7·7	10·0
4. Sales	—	2·2	—	—	82·0	0·2	15·9
5. Miners & Quarrymen	52·0	0·1	—	—	0·3	—	1·0
6. Workers in Transport & Communication	—	1·6	1·5	5·0	0·8	72·6	3·4
7. Craftsmen	16·0	88·1	92·0	58·4	9·3	14·6	6·0
8. Service	—	0·8	—	—	0·3	1·8	38·0
Total	100·0	100·0	100·0	100·0	100·0	100·0	100·0

(*Source* : Report of the Labour Force Survey, July 1963)

Table XIII

Number of Persons Employed in 1966

Occupational group	Mining & Quarrying	Manufacturing	Construction	Electricity, Gas, etc.	Trade & Commerce	Transport & Communication	Services	Total
1. Professional	6638	9648	3985	4455	6165	1832	171317	204040
2. Administrative	—	13094	996	1663	16441	5266	35390	72850
3. Clerical	6638	26876	2214	6051	52406	17,629	80430	192244
4. Sales	—	15161	—	—	842611	458	127884	986114
5. Mines & Quarrymen	21572	689	—	—	3083	—	8043	33387
6. Workers in Transport & Communication	—	11026	1660	1663	8221	166217	27346	216133
7. Craftsmen	6638	609127	101832	19417	95564	33426	48258	912262
8. Service	—	5513	—	—	3083	4121	305636	318353
9. Total	41486	689134	110687	33249	1027574	228949	804304	2935383

Table XIV

Number of Persons Employed in 1971

Occupational group	Mining & Quarrying	Manufacturing	Construction	Electricity, Gas, etc.	Trade & Commerce	Transport & Communication	Services	Total
1. Professional	8212	13750	5913	7712	8213	2599	242781	389180
2. Administrative	—	18660	1478	2877	21901	7471	50152	102539
3. Clerical	8212	38303	3285	10474	69808	25012	113982	269076
4. Sales	—	21607	—	—	1122410	650	181231	1325898
5. Miners & Quarrymen	26686	982	—	—	4106	—	11398	43178
6. Workers in Transport & Communication	—	15714	2464	2877	10950	235826	38754	306585
7. Craftsmen	8212	865270	151107	33608	127798	47425	68398	1301309
8. Service	—	7857	—	—	4106	5847	433131	450941
Total	51322	982143	164247	57548	1368792	324830	1139818	4088700

Table XV

Attrition Rates for the Plan Period

Professional, Technical and Related Workers

Occupation	*Attrition Rates*
Engineers	10·0
Chemists	7·7
Veterinarians	7·9
Biologists, etc.	10·2
Physicians and Surgeons	13·2
Dentists	16·3
Nurses and Midwives	10·0
Pharmacists	13·7
Optometrists, etc.	14·0
Medical workers, n.e.c.	14·0
University instructors, etc.	4·6
Jurists, etc.	14·0
Painters, etc.	13·6
Authors, etc.	9·6
Actors, etc.	9·3
Surveyors, etc.	8·3
Accountants	10·4
Social workers, etc.	15·4
Administrative, Executive and Managerial workers	16·9
Clerical workers	6·8
Sales workers	10·0
Miners, Quarrymen and Related workers	11·8
Workers in Transport and Communication Occupations	6·8
Craftsmen, Production Process workers and Labourers	10·5
Service, Sport and Recreation workers	10·1

Occupation	*Number Required*
Clerical Workers	
Book-keepers and cashiers	5,490
Stenographers and typists	1,310
Other clerical workers	85,930
Total	92,730

Sales Workers	4,55,300
Miners, Quarrymen and Related Workers	14,300
Workers in Transport and Communication Occupations	
Deck officers, Engineer officers and Pilotship	260
Deck and Engine Room Ratings, Crews and boatmen	21,530
Aircraft Pilots, Navigators and Flight Engineers	110
Drivers and Firemen, Railway engine	1,020
Drivers of motorised land vehicles	51,900
Drivers, Road Transport n.e.c.	20,780
Conductors and brakemen, railway	1,220
Inspectors, Supervisors, Traffic Controllers	1,920
Telephone, Telegraph and related telecommunication operators	2,420
Postmen and messengers	3,590
Conductors, Road Transport	9,250
Workers in Transport and Communication Occupation n.e.c.	700
Total	1,14,700
Craftsmen Production Process Workers and Labourers	
Spinners, Knitters, Dyers and related workers	18,170
Tailors, Dress-makers, Garment makers n.e.c.	50,930
Leather Cutters and related workers	4,990
Furnacemen, rollers, drawers, moulders and related metal making	9,740
Precision-instrument makers and watch makers	1,350
Jwellers, Goldsmiths, Silversmiths	5,600
Tool makers and machinists, n.e.c.	35,300
Plumbers and related workers	2,500
Welders and related workers	1,890
Platers and related workers	8,780
Electricians and related electrical and electronics workers	17,560
Joiners and Cabinet makers	2,090
Sawers and wood-working-machine setters and operators	5,230
Carpenters and wood workers n.e.c.	50,870
Painters and paperhangers	2,780

Bricklayers, stone masons and tile setters	22,170
Glasiers and construction workers, n.e.c.	1,260
Compositors and typesetters	4,790
Pressmen, electrotypers and engravers	350
Bookbinders and printing workers, n.e.c.	650
Potters and related clay and abrasive formers	12,880
Kilnmen, glass and clay formers	100

Estimating the Requirement of Manpower during the Plan Period

The difference between the manpower required as per the target of the plan and the expected supply is the manpower required. However, to this must be added :

(*a*) the attrition from the labour force due to death retirement and other reasons.

(*b*) current manpower shortages as identified from employment information reports.

(*c*) provision has also been made for modernising the employment structure. Table XV gives the attrition ratio and the additional manpower requirements.

The manpower requirement arrived at in the above manner has to be converted into enrolment targets for the various levels of education.

Special Problems in Estimating the Requirements of Teachers

Estimation of the required number of teachers could be done only after the enrolments for the different levels and types of education have been decided.

Steps in Estimating Teacher Requirements after Enrolments have been decided

(1) We can make use of the existing teacher-pupil ratio or another ideal teacher-pupil ratio.

(2) Divide the total enrolment in each grade and in each year by the appropriate student-teacher ratio to get the number of teachers required.

In projecting the number of teachers required on the targeted date, we have also to take into account the additional teachers needed for upgrading the training of the existing teachers.

Therefore, we can make assumptions about the actual quality of the teachers as for example :

(1) graduate teachers 4%.
(2) grade I teachers (secondary school +3 additional years of training) 28%.
(3) Grade II teachers (secondary school +2 years of training) 28%.
(4) Grade III teachers (primary school + 3 years secondary +2 years of teacher training) 40%.

Method of Calculating the Training Requirement per annum

The number of teachers of a given grade needed in any target year can be computed by multiplying the total number of teachers needed by the percentages shown above.

Number of additional teachers needed per annum

$$\frac{(N_t)-(N_o)}{Y_t-Y_o}+\frac{(N_t+N_o)}{2}\ (r)$$

where N_t=No. of teachers of grade *g* needed in target year.
N_o=No. of teachers of grade *g* in service at base year D.
r = per annum attrition of the particular grade of teacher.
Y_t= target year
Y_o= base year

Calculation of the teacher training college capacity.

We can use the following formula for computing the number of training places needed in teacher training colleges.

Places = (No. needed per annum) $(1+r)$
(length of training course)

where r = the average attrition rate of students in teacher training colleges.[4]

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[4] Manpower Planning by C.D. Fogg in Managing Economic Development in Africa. (P. 67)

5

Financing and Costing of our Educational Plan

An analysis of the past expenditure on education is essential for projecting the expenditure on education. The greater the details of analysis of the past expenditure the better it is for projecting the expenditure. The very process of analysis of past expenditures may reveal opportunities for getting more resources or for making better use of the existing resources. Therefore, we shall illustrate the analysis of past expenditure that has to be done.

Source of Data

The budgets or the annual administrative reports or the income and expenditure accounts maintained by the institutions themselves will be the major source of data. The information needed for analysis of past expenditures has to be collected carefully because the accounts are maintained in a certain way not so much for facilitating this kind of analysis as for ensuring that expenditures are accounted for. For example, expenditure incurred on a particular scheme will be found in different places in the budget and they have to be carefully brought together. It is not impossible though it is difficult and in order to get over this difficulty a different kind of budgeting called performance or programme budgeting has been suggested and it will be discussed in a later chapter.

Expenditure Analysis for Forecasting Expenditure of a Plan

The major operation in regard to the expenditure analysis for forecasting future expenditure is the conversion of the expenditure into unit expenditure like per pupil expenditure or per graduate expenditure or per class room expenditure or per teacher expenditure. Once the unit expenditure is available it has to be multiplied by the number of units to get at the total expenditure. Units can be the pupil enrolled or pupil in average daily attendance or pupil successfully completing a course (graduate) or teacher or a school with a certain number of class rooms, or class room or pupil place (number of seat) or sq. feet. The cost per pupil per year is a popular concept but its limitation for projecting future expenditure is that all items of expenditure are not related to the students. Items of expenditure are more related to the teacher than the number of students and therefore, the more common practice is to adopt the expenditure on teacher as the unit expenditure. Whatever be the unit adopted—and more than one unit has to be adopted for projecting the future—an analysis of the expenditure on education by items is essential particularly to find out whether there are some relationships among the different items of expenditure.

Analysis of Expenditure by Items

Expenditure has to be analysed in items of Recurrent and Capital. The economic distinction between the two is that while Recurrent expenditure has to be incurred every year, the capital expenditure is one for which provision is made once in a period of 15 years or so depending upon the life of the item under consideration and the benefit that will be available over a period of time. Thus expenditure on teacher salary is a recurrent item while expenditure on a school building is a Capital item. We can identify the expenditure and classify them as below.

I. *Recurrent Expenditure* includes
  1. for instruction
    (*a*) salaries and allowances (teaching and non-teaching staff) school textbooks.
    (*b*) other instructional expenditure, materials and supplies, etc.
  2. Other recurrent expenditure :
    (*a*) Scholarships and grants for study in the country.

(*b*) welfare services, canteens, transport, boarding, sport.
(*c*) maintenance of buildings and equipment.
(*d*) operations of buildings (fuel, light, water and gas).

II. *Capital Expenditure* includes

1. purchase and development of land.
2. school buildings, class rooms, laboratory and equipment.
3. other durable instructional equipment.
4. welfare services, residence halls.
5. others.

Debt Service

Amortization and repayment of loans and interest on these loans.

The following table shows the recurrent expenditure for the year 1963-64 and 1964-65 for teacher training institutions for primary school teachers in Andhra Pradesh. This is obtained from a survey of Elementary School Teachers' Education conducted by Department of Teacher Education NCERT.

Relationship between the Different Items of Expenditure and its Significance for Costing the Plans

An analysis of the relationship among the different items of expenditure can be done specifically with a view to finding out whether some items of expenditure are related in a very specific way with other items *e.g.*, the general assumption that teacher salaries constitute the major item—it may be around 80% at the primary level—while other items of expenditure are only 20%. Therefore, projection of expenditure can be done for the teacher salary and a fraction of it added to arrive at the total expenditure. Yet another assumption that is made in projections generally is that recurring expenditure is about 80% and only 20% is capital.

The following table shows the percentage composition of Recurring and Capital for some countries.

Table XVI

Recurring and Capital Public Expenditure on Education

	Recurring public expenditure	*Capital*
(1) India (1963)	84·4%	15·6%
(2) China (Taiwan) 1965	85·6%	14·4%
(3) Ceylon (1965)	95·1%	4·9%
(4) U.S.A. (1965)	80·3%	19·7%
(5) Japan (1965)	76%	24%
(6) Federal Republic of Germany (1965)	70·7%	29·3%

We have given illustrations for certain countries in regard to the composition of Recurring and Capital expenditure in the total public expenditure. If this kind of analysis is done for a country over a period of time, projections can be made on the basis of the past trend. We can deliberately change the trend in the composition of teacher cost and non-teacher cost. It may be that the teacher salary has been rising because of pressures of demand for higher wages but that has taken place at the expense of the non-teacher cost because the overall allocation has not been raised. This is bound to have an adverse effect on the quality of instruction and therefore, it may be necessary to ask for more resources.

Further Analysis of Expenditure on Education by Purpose

Analysis of expenditure on education by purpose—at the national level or a local level or at the level of an institution and its comparison over a period of time will tell us whether one item is recurring too much of attention at the expense of another.

The following table shows the percentage of distribution of total recurring expenditure in 1968-69 on educational (consisting of salaries, workshop, library, N.C.C., etc.) administration (establishment charges, stores, printing, etc.) and welfare services (students, hostel, medicine, etc.).

Table XVII

Recurring Expenditure for the Year 1963-64 and 1964-65

Item	Average amount spent Rs.	Range Rs.	Percentage of institutions responding	Average amount spent Rs.	Range Rs.	Percentage of institutions responding
1. Salaries and allowances of the teaching staff	16070·64	1437-37954	76·6	17889	16979-40968	86·6
2. Salary of non-teaching staff	7184·46	2296-48000	76·6	7106·71	889-58871	86·6
3. Teaching aids	763·48	80-2578	30	1463·33	56-7858	33
4. Library books and journals	431·26	36-2885	73	928·51	60-7000	80
5. Laboratory equipment	867·81	150-3039	36·6	1206·75	130-3533	36·6
6. Travelling allowances of the staff	901·65	150-3133	80	915·11	139-2476	90
7. Stipends	41253·65	825-124935	36·6	32871·31	94-18575	50
8. Stationery	636·46	122-2100	46	1044·59	173-78837	53
9. Crafts	323·1	34-788	36·6	610·29	100-3085	43
10. Games	184·89	54-459	40	162·46	17-350	40
11. Miscellaneous	2516·18	120-7493	33·3	3784·89	120-18239	36·6

Analysis of Per Pupil Cost by Items of Expenditure for more Realistic Forecasting of Expenditure

The per pupil cost could be divided into as many parts as are meaningful. Estimates done on the basis of the knowledge of such components will be more realistic than when it is done on the basis of global knowledge. For example, let us have the following notations for indicating different kinds of per pupil cost.

N = per pupil recurring cost.
Na = per pupil teacher salary cost.
Nb = per pupil personal cost other than teacher salary.
Nc = per pupil cost of general administration.
Nd = per pupil cost of maintenance and character of institutions.
Ne = per pupil cost of books.
Nf = per pupil welfare cost (school meals, etc.)
Ng = per pupil auxiliary cost (like transport)
Nh = per pupil scholarship and stipend cost.
Ni = per pupil cost of instructional materials, other than books.

Per pupil recurrent cost for any level of education :

$$N = Na+Nb+Nc+Nd+Ne+Nf+Ng+Nh+Ni.$$

The components of the above formula are actually averages of the gross costs divided by the enrolment. Assumptions have been made regarding each of the above magnitudes and projections of cost made for countries of Asia by UNESCO in Asian Model for educational development (Asian Model for Educational Development, UNESCO).

Usefulness of the Comparison of Expenditure on Education with the GNP

The rate of growth of GNP is one of the targets in a plan. On the basis of the expected rate of growth of GNP, the GNP for the target year of the plan can be worked out. The total expenditure on education on the basis of the assumed per pupil cost can be expressed as a percentage of GNP. Generally developing countries are not able to spend more than 5% of their

GNP on education while developed countries spend 6% or above. The financial implication of an educational plan expressed as a percentage of GNP will provide an initial check as to whether the plan can be implemented at all or not.

Rate of Growth of GNP and Rate of Growth of Annual Expenditure on Education

The rate of growth of expenditure on education per annum can be taken into account along with the rate of growth of GNP per annum. Educational plans in some countries like Italy, Greece, Spain and Yugoslavia have found it convenient to assume that the annual growth of expenditure on education can be twice as high as the annual growth rate of GNP. If GNP grows at 5% per annum, expenditure on education can be expected to grow at 10% per annum.

Priorities in Regard to Expenditure on Education

The problem of priorities in regard to expenditure on education arises at the following levels.

(1) Expenditure on education *vis-a-vis* other sectors of social and economic activity of the government.

(2) Within education distribution of expenditure among the different levels like primary, secondary, higher and types of education like general and technical.

(3) Within every level of education how much is to be spent on teacher salary, non-teacher salaries, equipment, etc.

1. Expenditure on Education vis-a-vis Other Sectors

In the context of planning for social and economic development economic theory offers a solution to the problem of allocation of resources to the different sectors at the margin where the problem of allocation arises. (The concept of margin has already been explained earlier. The problem in planning is not whether to have something for this sector and making for another sector but how much more for one sector and how much less for another). At the margin returns from investment in every sector must be equal. Applying this principle to the case of investment in education one can say that the returns from investment in education must be equal to returns from investment in education. Therefore, economists have got interested in finding out the return from investment in education.

Definition of Returns from Investment in Education

Economists measure the benefits from education to an individual or a society on the basis of the future level of income or output that it is expected to make to an individual or the society. This higher output is reflected in the higher earnings of the educated workers because the more productive a worker is, the more is his earning. Such earnings are calculated for the whole lifetime of the educated and the uneducated workers. The difference in the earnings between the educated and the uneducated is the benefit arising out of education.

Are the Earnings of the Educated Sufficient to Measure the Benefits of Education ?

The earnings of persons in any society are not merely the result of their education but also due to habits of employers, the difference in abilities of persons, etc. In the U.S.A. where the practice of calculating returns from investment in education on the basis of the earnings of the educated originated some allowances have been made for differences in the abilities of individuals. The calculations of the earnings of the educated persons have been made for 16 developed and developing countries which are Canada, Denmark, U.K., Japan, Netherlands, Sweden, U.S.A., Columbia. India, Israel, Mexico, Nigeria, Phillippines, Pureto Rico, Uganda and Venezuela. These calculations have shown :

(1) that at every age the highly educated earn more than persons with less education ;
(2) earnings increase with age up to a peak at middle age and then flatten or even decline up to the age of retirement ;
(3) in the case of the highly educated the trends are steeper ; and
(4) the age at which earnings reach their peak is later for the educated than for the uneducated. (P. 19 cost benefit analysis in educational planning by

M. Woodhall, International Institute of Educational Planning).

Other Benefits of Education

One can think of other benefits resulting from education ranging from literacy to higher levels of education. There have not been many studies on the problem. A study on the relationship between primary education and productivity in India shows that the farmer with primary education rates higher in his productivity than those without. The literate farmers will be able to accept modern methods of cultivation and willing to do so and apply fertilisers and manures.

Calculation of the Returns from Investment in Education

Suppose it is accepted that earnings of the educated neglect the return from investment in education, they accrue to a person only over a period of time and they have to be discounted so that they can be expressed in terms of their present value.

This technique of measuring future streams of income in terms of their present value is called the discounted cash flow technique. With the help of this technique one can convert the stream of future income into its present income. The relationship between the increase and the cost of education is a measure of the rate of return from investment in education.

According to the principles of economics allocation to education must be so much that returns from investment in it are equal to the returns from investment in other activities.

Though the above principle can be stated easily it does not yet provide a guidance for decisions regarding investment in education in any country in the world. In fact, economists have been accused of talking in two voices ; one when they talk of education as investment and the other when it comes to a question of allocating money to education. Without further research it is not possible to suggest the amount to be allocated to education.

Allocation to Different Levels of Education

The allocation to the different levels of education has to be on the basis of the objectives like free and universal primary education. So far as the requirements of economic development are concerned the satisfaction of the manpower requirement in the form of engineers is regarded as the major imperative.

The present position regarding the unemployment of engineers in India and the reference made above to the return from investment in education shows that there is need for alternative approach to the question of expenditure on education among the different levels.

A Model for Ensuring that Expenditure on Education is in Harmony with the Needs of Economic Development

It is not possible to limit the expenditure on education on the basis of economic considerations alone. It is the right of the decision maker to take into account all aspects of a given situation and decide on the amount of money to be spent on education. The object of this model is only to indicate the manner in which it has to be integrated with the requirements for economic development.

Total expenditure on education in any country cannot exceed more than a certain percentage of GNP and the budget. In developing countries it is found that it has not been possible to exceed 5% of GNP (or even come close to that in some countries) and in terms of the total government expenditure cannot exceed 32% or so. This is fairly obvious in view of the need for expenditure on other sectors in developing countries.

The expenditure on primary education has to be taken into account along with expenditure on past primary education like adult education or expenditure on social education. Many studies have found that retention in primary level can be improved by means of general rise in the level of population in a given region. At the level of secondary education the expenditure should be properly allocated among general, technical and teacher training. The expenditure on technical education must take into account the possibilities of employment of the persons coming out of the system. The expenditure on higher education will have to take into account the possibilities of employment or the manpower requirements. The cost per pupil spent at every level of education has to bear proper relationship with each other. In countries like India, where economic growth is attempted for the country as a whole, expenditure on education should not be allowed to lag far behind in any part of the country. Unless it is decided as a matter of strategy of economic growth that some part of the country will be developed.

Allocation of expenditure in every level for teacher salaries, non-teacher salaries, equipment, etc., within every level of education, when the total allocation is given one item of expenditure may get prior attention over another. This may lead to fall in standards. Therefore, it is necessary to ensure all items of expenditure are optimised.

6

An Alternative Approach to Planning of Education on the Basis of Expected Resources

In this chapter we shall indicate an alternative approach to planning of education on the basis of the expected resources available for education. The following are the steps needed for such an approach :

(1) prepare an estimate of financial resources.
(2) prepare estimates of future per pupil cost.
(3) derive targets of enrolments that can be supported with the estimated resources.
(4) compare the derived enrolment with the population projections in order to find out whether the available resources will permit further progress in enrolments.

1. preparing an estimate of financial resources available for education.

To prepare an estimate of financial resources likely to be available for education one has to know by how much GNP in that country is expected to grow. This will generally be available in the plan of that country. If it is not available one can look at the past trend and make reasonable assumption about the future.

2. In an ultimate sense the resources available for education depends on GNP, but more relevant is the amount of resources which the government will be able to command.

Taxes are the major source of revenue. The table at page 82 Table XVIII shows total tax revenue as percentage of NI for Indian union, States and union territories for the period 1950-51 to 1968-69 and expected yield for 1969-70 to 1980-81.

Table XIX gives tax revenue as percentage of state income.

Future expenditure on education can be expressed as a percentage of GNP, or percentage of the budget or per capita expenditure. Education Commission of India expressed the target of expenditure on education as a percentage of GNP in 1980 and recommended that it should rise to 5 times per capita from Rs. 12·00 in 1965 to Rs. 60·00. In big countries like India where large variations in per capita expenditure could exist it is natural that the education commission should have laid down a target of per capita expenditure also. A third criterion that could be adopted is the percentage of the budget devoted to education. In fact, a given percentage of GNP on education can be spent with different levels of public expenditure on education because there can be a private sector also spending on education.

3. Prepare estimates of future per pupil cost. If we know the present per pupil cost, then we can incorporate the desirable changes in future per pupil cost and for that purpose it will be helpful if we can have break-down of the per pupil cost into teacher cost and non-teacher cost and the various other components of the per pupil cost as it has been indicated above. An ideal thing to do would be to project the optimum combination of per pupil cost on teacher salary and other items. The optimum combination of expenditure on different items has to be arrived at taking into account the past relationship between cost and quality of education. (Researches on these lines have now become common in the U.S.A. and one of the studies has found a significant relationship between the salary of the teacher and the quality of education.)

4. Derive the targets of enrolments that can be supported with the estimated resources.

Once the per pupil costs are assumed and the total resources likely to be available are estimated the number of pupils that can be supported with these per pupil costs can be projected.

5. The enrolments that are arrived at on the above basis can be compared with the enrolments arrived at on the basis of the projections of population and the children in the respective

age groups. If the enrolments that could be supported by the estimated resources are much lower than what is required on the basis of population projections, ways and means will have to be thought of relating the educational system with the requirments of economic development so that GNP can grow at a much faster rate. This is called improving the external efficiency of the educational system. It is also necessary to improve the internal efficiency of the educational system by ensuring that optimum use is made of all resources available for education.

The following section shows the assumptions regarding per pupil cost on various items, the rate of growth of GNP, the percentage of National Income as revenue for the Government and the total expenditure on education for some countries in Asian Region. This methodology has been followed in projecting the cost of an educational system in Asian Model by UNESCO.

Table XX gives the per pupil cost at page 84—Recurring cost by items and Capital cost per pupil place for Burma, Cambodia, India, Indonesia, Iran, Mangolia, Pakistan and Republic of Vietnam. These countries have the common characteristic that they are likely to achieve free and universal primary enrolment round 1980. We are giving only the assumptions relating to first level of education. In estimating future per pupil recurring cost it is necessary to take into account the average annual salary of teachers, the pupil-teacher ratio and the proportion of teacher salary to total recurring costs.

Estimation of Capital Cost has been done in the Asian Model put forward by UNESCO taking into account : (*i*) the desirable area per pupil, (*ii*) net building cost per unit of area, (*iii*) the cost of site, and (*iv*) the cost of furniture and equipments. Table XXI at page 84 shows the assumptions in regard to Capital Cost per pupil place in U.S. Dollars.

Table XXII gives the cost of education as percentage of GNP under three assumptions relating to growth of GNP and for each rate of growth of GNP under alternative assumptions of public revenue.

Table XVIII

Combined Tax Receipts of the Centre, States and Union Territories as per cent of National Income : 1950-51 to 1970-71 (with I.I.P.O. Projections up to 1980-81) by Agency of Collection

Year	National income (at current prices)	Total Tax Revenue	Total Tax revenue as per cent of National income
1950-51	9,530	626·67	6·58
1955-56	9,980	767·56	7·69
1960-61	13,294	1,350.4	10·16
1965-66	20,621	2,921·59	14·17
1966-67	23,624	3,261·19	13·80
1967-68	28,356	3,455·51	12·19
1968-69	28,583	3,758·73	13·15
1969-70	30,870+	4,075·28	13·20
1970-71	33,957++	4,603·57	13 56
1975-76	47,628	7,475·45	15·70
1980-81	66,800	12,171·20	18·22

+ Estimated at 8% growth at current prices.

++ I.I.P.O. estimate at 10% growth at current prices.

Table XIX

State Incomes for 1962-63 to 1964-65 (Average), **Tax Revenues 1967-68 and Tax Revenues as Proportion of the State Incomes**

	State incomes for 1962-63 to 1964-65(av.)		Tax revenues[1] in 1967-68		Percentage of tax
	Total Amount (Rs. crores)	Per Capita Rs.	Total amount (Rs. crores)	Per Capita[2] (Rs.)	revenues to State incomes (Col. 4 to 2)
Punjab	595	492	50·20	37·46	8·44
Maharashtra	2019	478	168·28	36·50	8·34
West Bengal	1742	465	108·11	26·30	6·21
Gujarat	1025	462	71·90	29·59	7·01
Haryana	367	445	26·34	28·95	7·18
Tamil Nadu	1408	400	109·54	29·37	7·78
Assam	503	393	26·31	18·66	5·23
Andhra Pradesh	1460	386	79·48	19·67	5·44
Mysore	936	373	63·10	23·28	6·74
Kerala	616	341	53·79	27·44	8·73
Madhya Pradesh	1126	325	63·54	16·94	5·64
Rajasthan	683	314	46·60	19·50	6·82
Uttar Pradesh	2398	306	123·09	14·60	5·13
Orissa	568	306	24·25	12·12	4·27
Jammu & Kashmir	111	302	7·58	19·44	6·83
Bihar	1308	265	64·29	12·06	4·91
Nagaland	N.A.	N.A.	0·23	5·75	N.A.
Total	16865	369	1086·63	21·92	6·44

[1] Excludes transfer of taxes from the Centre but includes receipts from inter-State Sales Tax, road tolls (J & K) and royalty on mineral oil (Assam and Gujarat).

[2] Based on population estimate for March, 1967 as worked out in the Central Statistical Organisation.

Source : Report of the Finance Commission, 1969.

Table XX

Recurring Cost Per People, 1964 and 1980 (for Group B Countries) (U.S. Dollars Constant Prices)

First level I—VII	*1964*	*1980*
1. Animal salary per teacher	82528	8400
2. Proportion increase	100	155 %
3. Pupil teacher ratio	38	45
4. Teacher salary as a part of total costs	85	80
5. Per pupil cost of text books	1 dollar	1 dollar
6. Proportion of pupil receiving free text books	15	100
7. Per pupil cost	8·15	12·10
8. Teacher salary	6·80	8·90
9. Other costs	1·20	2·20
10. Text books	·15	1·0

Table XXI

Capital Cost Per Pupil Place in U.S. Dollars

	Net building cost per sq. m.	Area per pupil place	Net building cost per pupil place	Site cost	Furniture & equipment
Firt level I—VII	27	1·3	35	34	7

Tota per pupil place cost :—46

Table XXII

Estimated Public Expenditure on Education in Relation to Estimated Public Revenue, 1964, 1970, 1975 and 1980

	Public expenditure as per cent of public revenue			
	1964	1970	1975	1980
Public Revenue Hypothesis I (Low)				
GNP annual growth at 4%	10·63	13·74	15·53	17·19
GNP annual growth at 5%	13·96	16·85	17·48	16·60
GNP annual growth at 6%	13·44	15·33	15·16	13·73

Table XXIII

An Asian Model of Educational Development : Perspectives for 1965-80 Cost of Education in Relation to GNP, 1964, 1970, 1975 and 1980

	Cost as per cent of GNP			
	1964	1970	1975	1980
Group B				
GNP annual growth at 4%	3·43	4·76	5·57	6·18
GNP annual growth at 5%	3·30	4·33	4·83	5·11
GNP annual growth at 6%	3·17	3·93	4·19	4·22

7

Efficiency and Productivity of Education

Efficiency is an objective which everyone tries to achieve. The educational administrator is always supposed to be proving this objective and therefore, there is nothing new in the concept of efficiency. But what is new in the modern approach to efficiency is its linkage with productivity which is an economic concept. Productivity, as has been explained earlier, is simply the product per unit of effort that has been put in. The effort put in is called input in the economic jargon and the outcome is called output. The output per unit of input is called the productivity. Productivity is a measure of the efficiency.

External and Internal Efficiency

When productivity of education is considered we can distinguish between external and internal efficiency. Education tries to attain certain external objectives like the development of the personality of a child, his ability to earn a living in a society, etc. The concept of external efficiency tries to measure the extent to which education succeeds in achieving these objectives. The economists are naturally interested in finding out to what extent education succeeds in attaining the growth of GNP of a country and they have tried to measure the productivity with the help of the earnings of the educated persons. The return from investment in education is a measure of the external efficiency or productivity of education.

Inadequacy of the Measurement of External Productivity

The above method of measuring external efficiency which has been used by the economists is unsatisfactory mainly because earnings of the educated persons do not capture adequately the benefits of education. Therefore, an alternative approach has been advocated by Philip Coombs in his book, *World Educational Crisis* in which the framework of economic analysis has been used namely the input and output approach. The inputs of education are identified as also the output and the process that constitutes the interaction between the two. The following diagram shows the interaction between an educational system and the environment.

Internal Efficiency of the Educational System

The educational administrator will be more interested in assessing the internal efficiency of the educational system and improving its productivity. The following factors affect the internal efficiency. They are :

(1) Teachers
(2) Curriculum
(3) Equipment and facilities
(4) Marginal and supporting services
(5) Organisation
(6) Costs
(7) Teaching materials
(8) Research.

Expenditure on teacher salary is a major item in the budget in education and teachers constitute an important input in the educational process. It is necessary to ensure that teachers are used properly. Economic analysis provides an approach for analysing the efficiency of the use of teachers as well as other inputs like school buildings and laboratory equipment. This is called optimum use of teachers or other equipments or ensuring that schools are of the optimum size.

Concept of Optimum

The concept of optimum is an important one in economic theory. In the literature on planning there is a good deal of discussion on the procedure for optimising. In order to define an optimisation procedure a criterion must be specified.

The results of the optimisation procedure will depend upon the criterion chosen—they are sensitive to the criterion chosen and hence the criterion has to be chosen carefully. This criterion is called an objective function. The objective function judges the desirability of one course of action rather than on another. This is also called an optimality analysis. In such an optimality analysis it is also possible to take into account constraints or restrictions.

Suppose the problem under consideration is planning for a university. We must have an objective function which measures the performance of a university. When the objective function measures the contribution of the university to a society, the function is maximised. We have already indicated a method of measuring the contribution of education to the National Income by taking into account the present value of the contribution of education to the future National Income. The objective function can be to maximise this. When we consider the cost of the university we can say that the cost is to be minimised. When the planner specifies the objective function he can take into account different factors and have attitudes towards the objectives. All that is required is that the form of the objective function and the objective (contribution of each of the outputs or cost of each of the outputs) must be specified. The method by which such a maximisation or minimisation is carried on is called mathematical programming.

In specifying the objective function the constraints have to be taken into account. Thus in planning a university the constraints are the teachers, the students, the building and other resources supplied to the educational system from outside. These can be done for each year of the planning period. If the objective function and the restrictions are linear, the technique applied is called linear programming. "Linear programming is the name given to a method of formulating and finding the optimum set of activity levels in planning problems." (*Planning Educational Systems for Economic Growth* —S. Bowles, p. 226. In the same study, there is a model which has considered 200 activities and 450 constraints).

Problems to which Linear Programming Technique can be Applied

Illustrations

(1) How many students have to be admitted in a certain year to general secondary schools and secondary vocational education.

(2) If 70% of the children get enrolled and 30% of them complete elementary education, should more money be spent on creating more schools. The problem may be stated as one of maximising the number of students graduating taking into account the limited resources available.

(3) The optimum size of a school with reference to any factor like the teachers or the number of class lecture periods and laboratory periods.

Empirically we can find out the relationship between class and laboratory periods in order to obtain a certain quality of education.

If the desired quality of education is known on the basis of the above empirical investigations, we can know the relationship that must exist between class and laboratory periods and the number of students who must attend each period. Suppose we find that 25 students in a class receiving 30 periods per week must receive 10 laboratory periods. This means that school A with one such grade will use the laboratory only during 1/3 of the periods in which it is available. The cost per student in school A will be higher than in school B, in which there are 2 such grades of 25 students each because in school B, both classes can use the same laboratory. Thus we see that the larger the number of classes with 25 students each, the lower the cost per student. We can consider that size of the school as the optimum which minimises the cost per student.

(4) What is the optimum size and number of schools required to provide education to a group of students in a region in a country.

A Major Illustration in the Application of Optimality Analysis to Educational Planning

We shall end this chapter by referring to a recent work in which the idea of optimality has been applied to answer the following four questions in the field of educational planning and policy making for Northern Nigeria and Greece (*Planning Educational Systems for Economic Growth* by Prof. Sammual Bowles).

(1) Is the total amount of resources used by the educational system optimal ? Can social welfare be increased by shifting resources from education to production of other goods.

(2) What is the socially optimal distribution of resources within the system *i.e.*, should more resources be devoted to primary education than secondary education ?

(3) How should education be produced ? Would it be more efficient to reduce the number of years in primary school by increasing the duration of school year ? Should audio-visual methods and other equipment be substituted for teachers ?

(4) If teachers can be imported from abroad and students sent abroad for study, should this be done ?

The four questions cited above have been raised for each of the years of planning and the economic principle of maximisation subject to constraints has been applied.

Limitation of the Economic Analysis of Efficiency of Education

Decision making in educational planning cannot be guided by economic considerations alone because education is not merely a means for attaining certain ends or objectives but also an end or a good in itself. Therefore, economic analysis should be used along with other kinds of analysis.

8

Cost Benefit Analysis in Educational Planning

In recent years cost benefit analysis has been put forward as a basis for decisions on investments in sectors like health and education. Investment in industries has always been taking place on the basis of considerations of cost and benefit. Economists are advocating the extension of its application to fields like health and education where the benefits are not so readily seen.

In this chapter we shall explain the technique of cost benefit analysis and illustrate its application to certain fields of activity in education. It will be seen that cost benefit analysis is more an approach than a single technique. The main use of economics for educational planners is that it makes them within the framework of cost benefit analysis. This approach can be adopted at the stage of preparing a project or evaluating it or for evaluating the educational system as a whole. We have already indicated in an earlier chapter the method of evaluating an educational system on the basis of the rate of return from investment in education. In this chapter we shall indicate the methods of using cost benefit analysis in planning and evaluation of different kinds of projects in educational planning. The projects could be :

(1) Introduction of new teaching media like T.V. in a given level of education.
(2) Planning and evaluating a vocational education programme.
(3) A project for eradicating illiteracy of the adults.
(4) A programme of retraining and employment of the adults.

(5) Introduction of school meals during midday at primary level of education.

(6) Distribution of resources like teachers or laboratory equipment to the schools by a directorate of education.

(7) Projects for improvement of science education.

There are certain theoretical principles to be borne in mind in considering any project within the cost benefit framework. They are the following :

(1) What should be the coverage of cost and benefits? i.e., any project is likely to have its effect on many other sectors of the economy and for a period of 15 or 20 years of time depending on the economic life of the project. To what extent these have to be taken into account (e.g., an educated person is able to earn higher salary for a long period of time).

(2) How to evaluate the costs and benefits? Can the market prices be used? If not, how can we construct "shadow prices"?

(3) Since we have a long time horizon, how can we convert the benefit accruing after 15 or 20 years time to its present value? Usually it is done by using a discount rate, but what is the discount rate to be used?

The three questions have to be raised in regard to the project that is being considered. The asnwers for them can be found only with the help of experts. Therefore, it would be necessary to have auxiliary groups consisting of members of different disciplines. We give below as an illustration the problems and the composition of an auxiliary group for each one of them.

List of Diagnostic Observation
Assignment to the Various Auxiliary Groups

	Auxiliary Groups
1. Measuring the impact of the educational system on the population (demography, school enrolment, growth rate) :	Statistics

	Auxiliary Groups
2. Measuring the school output (flow and production indicators).	Statistics
3. Analysis and study of the system's productivity :	
(*i*) Measuring the productivity factors	
School Buildings	School Buildings
Supplies and Equipment	School Buildings
Professors and Teachers	Teaching
(*ii*) Productivity year/student	Statistics
4. Measuring the efficiency of the school system (difference in relation to intended objectives).	All the auxiliary groups
5. Measuring the adjustment (difference in relation to the functional objectives of the school system)	
—Difference between the school outputs and the requirements in manpower	Manpower and employment
—Socio-cultural difference	Teaching and Sociology
6. Measuring the rentability of the system (unit and total costs, allocation of resources, effects of the system).	Education Financing and Economics
7. Measuring the external savings and wastage.	Carte Scolaire
8. Measuring the effects produced by causes that are foreign to the National Community.	All the auxiliary groups
9. Measuring the plasticity of the system and the administrative efficiency.	Administration and Structures
10. Measuring the inter-regional imbalances	All the auxiliary groups and particularly the Carte Scolaire

Suppose B_1, B_2, B_3, B_n represent the benefit for each year of the life of the project, C_1, C_2, C_3, C_n the cost of the project each year. and r represents the rate of discount, then it is worthwhile choosing a project if

$$\left(\frac{B_1}{1+r}\right)+\left(\frac{B_2}{1+r}\right)^2+\left(\frac{B_3}{1+r}\right)^3+\left(\frac{B_n}{1+r}\right)^n$$

is greater than

$$\left(\frac{C_1}{1+r}\right)+\left(\frac{C_2}{1+r}\right)^2+\left(\frac{C_3}{1+r}\right)^3+\left(\frac{C_n}{1+r}\right)^r$$

In other words, if the benefit cost ratio is greater than one for a project, that project is to be chosen from among a number of projects. The greater the ratio the more preferred will be the project.

Illustrations

We shall illustrate the methodology for evaluating some projects. These have been either used or suggested for use in other countries.

Project

Manpower training for industry.

Institutions providing this training

Government training centres.

Economic benefits

They can be identified from the point of view of the individual trainee, from the government budget point of view and from the point of view of the economy as a whole.

(1) *Economic benefits from the individual point of view*

Increased future earnings, better job security and government maintenance grants during training are the benefits to the individual. As against these the costs are the earnings foregone during the training and other social welfare allowances that will not be payable to a person on account of this training programme —There may be other more general individual benefits like better job satisfaction, happier domestic background, etc., which will not be entering into the above method of calculation.

(2) *The government budget side*

From this point of view one looks at the effect of these programmes on the flow of government outgoings and receipts. On the expenditure side, there are the capital costs of the scheme, recurring costs for running the training centres and the re-training grants. On the revenue side, we can include the net increase in tax revenues payable on the higher post training incomes. We have also to set off the loss in tax revenues during training of a person.

(3) *Benifits and costs to the economy*

The most important benefits and costs are these relating to the economy as a whole. Different kinds of resources are used in conducting the training programme and they could not be used for other purposes. They are :

(*a*) Capital costs for setting up the training centres.

(*b*) Raw materials used in setting up the centres.

(*c*) Loss in the potential output of the persons from other occupations who are employed in the operation of the training programme in different ways. All the direct and indirect resources cost to the economy of the training programme has to be worked out.

Benefits to the Economy—Procedure for Collecting the Data

The most straightforward method is to collect the data on earnings of the workers before undergoing the training and after. But this method suffers from the drawback that it may include even the normal trend in earning and it may not be proper to attribute all the earnings to the training. Therefore, it may be better to compare the earnings of workers who had not undergone any such training with those of workers who had undergone such training. It must be ensured that the workers are comparable to each other in all other respects. The following table shows the average costs and benefits of adult retraining at government retraining centres.

Table XXIV

Average Costs and Benefits of Adult Retraining at Government Training Centres

1. Costs		
National average training cost per adult, p.a.	1200	
Administrative costs outside GTC's, p.a.	150	
Total cost of training an adult	1,350	= 675
minus training allowances plus earnings forgone during training		−286 +214
Total economic resource cost of retraining an adult		603
2. Benefits		
Annual earnings of the retrained	794	
minus estimated annual earnings in the absence of training	−429	
Net monthly income gain of retraining		320÷12=27
3. Average Pay-Back Period : (*i.e.*, cost of retraining divided by monthly benefits)		603÷27=22 months
4. Rate of Return : (*i.e.*, rate of discount equating the present value of benefits with the present value of costs)		30%

An illustration of the use of the technique of cost benefit analysis for evaluating a programme of vocational education. (Let us say the products of the industrial training institutes in India)

Suppose 10 students graduate every year ; operating cost per graduate per year is Rs. 15,000/-, capital cost (the current value of the equipment and the space being used) is Rs. 25,000/-. If it is further assumed that the programme will last 10 years and 5% is an appropriate interest rate to use then the total cost per student is Rs. 1,823/- (1,500+·1295)(25,000)÷10. ·1295 is an annuity where present value is 1 taken from interest tables for a 5% rate of interest and ten year time period. For the benefits of the programme to be just equal to the cost the average student will have to earn additional future income which had the present value of Rs. 1,823/-. Suppose the length of working life of the student is 20 years, this figure could be converted into an average annual amount of additional future income by dividing by a factor (12·46) equal to the present value of an annuity of one dollar per year for 20 years at 5% rate of interest. On these assumptions a graduate of ITI must earn Rs. 146/- of additional income per year on an average for 20 years in order that the benefits may be just equal to costs.

Table XXV

Calculation of Social and Private Returns to Higher Education in Urban India, 1960-61

Age	Average annual earnings of		Pre-tax earnings differential of graduates	Post-tax* earnings differential of graduates
	Graduates (Rs. per annum)	Matriculates (Rs. per annum)		
18	—	495	—	—
19	—	998	—	—
20	—	1,174	—	—
21	—	1,403	—	—
22	1,480	1,453	27	27
23	1,691	1,456	235	235
24	1,765	1,483	282	282
25-29	2,923	1,959	964	964
—	—	—	—	—
50-54	5,405	3,109	2,296	2,246
55-59	4,214	2,492	1,722	1,698

*Obtained by applying the standard rate of income tax payable by a married man with two children ; because of the low level of income tax levied in India, graduates and matriculates in the 18-30 age group do not, on average, pay tax, although they become liable to do so as their earnings increase with age.

Source : M. Blaug, R. Layard, M. Woodhall, *op. cit.*, Table 7.1.

9

Systems Analysis and Other Management Techniques for Educational Planning and Administration

In recent years management techniques are increasingly being applied for solving many problems where complex decisions are involved. The literature on management techniques has grown so much that it calls for a separate volume for itself. In a book on economics for educational planners our justification for dealing with it is that the management techniques help the attainment of the goal with which the economist is concerned, namely, to raise efficiency and productivity of educational systems. It can also be used for improving the allocation of resources.

Cost benefit analysis and systems analysis (which is one of the major techniques of management)—both derive from the same general principle ; to compare several situations from the double point of view of factor consumption and the production of goods and services and in this way to draw up an order of preference in the light of specific criteria. In cost/benefit analysis these criteria are generally based on economic data but this is not necessarily the case in systems-analysis.

Definitions of System Analysis

One of the authorities on the subject, Dr. Alian Entheven has defined "system analysis technique as the application of methods of quantitative economic analysis and scientific method in the broadest sense to the problems of choice. It is a systematic attempt to provide decision makers with a full accurate and meaningful summary of the information relevant to clearly defined issues and alternatives. This systematic attempt brings to bear on the problems of planning a programme many relevant disciplines and does it in an integrated manner. The list includes in the case of defence problems (where it has been applied widely) traditional military planning, economics, political science and other social sciences, applied maths. and the physical sciences. As the above definition shows systems analysis is not based on a general and absolute method because output and input values depend upon the specific problem to be dealt with.

The first step in systems analysis is to define appropriately the features of a system. Such a definition has been done recently by P.H. Coombs in one of the recent books called World Educational Crisis. (p. 178)

The educational system is viewed like all other productive enterprises in the field of economic organisation. The process of production in education is analysed by identifying the inputs like students, teachers and the money which are being used by the educational system. Like the process of production, the educational process is also supposed to produce certain outputs which should have several characteristics. These are the different objectives which the educational system seeks to promote. All these form a dynamic and organic whole which implies that there are all kinds of interconnections between the inputs and process on the one hand, and the process and the output on the other. Further, there are all kinds of interconnections among the various elements which go to make up the input and help the process and produce the output.

It is essential to improve the efficiency of this process of education. But, unlike in the other activities, there is no definite criterion for measuring the efficiency of the system. Therefore, first of all it is necessary to diagnose the efficiency of the system. For this purpose the relationship between the different components which help in the process of education must be examined. We can do this with the help of a systems analysis. In this process, analytical terms and concepts associated with economics, engineering and sociology are used.

Inputs into the Educational System

The educational system is carried on with the use of a number of inputs, and we can identify the following 11 major components. These are regarded as critical for the functioning of the educational system. These are themselves related to each other and act and react upon each other. These are :

(*i*) The aims and priorities which are set up by the society and the policy-maker for guiding the activities of the educational system.

(*ii*) Students, who constitute the most important inputs subjected to the process of education. Undoubtedly, learning and imparting instructions to the students are the main aims of the system.

(*iii*) Management, coordination and direction, and evaluation of the educational system. The educational system in our country is a big organisation, both in terms of administration as well as instruction, and the management of this process is an important input.

(*iv*) Structure and time schedule to use the time and the student-flows among the different purposes.

(*v*) The content of the courses, which is the essence of what the students are supposed to learn.

(*vi*) Teachers to help the learning process.

(*vii*) Learning aids like books, blackboards, maps, laboratories, etc.

(*viii*) Facilities for the educational enterprises.

(*ix*) The techniques used in doing the work of the system.

(*x*) Quality controls like admission rules, marks and examination standards.

(*xi*) Costs, which are the indicators of the efficiency of the system.

These internal components are affected by the resource inputs going into the system from the society and determine the nature of the output coming out of the system. More specifically, the existing knowledge, values and goals of a society influence the educational aims and contents. The population and its age-structure and the qualified manpower stock determine the number of students and teachers. The percentage of gross national income and the physical items of output influence the finances and the physical items going into education. The students coming out of the system are the output, and they are better equipped to serve society "as individual and formal members, workers in the economy, leaders and innovators, local and world contributors to culture because education improved their basic knowledge, intellectual and manual skills, powers of criticism, values, attitudes, motivations, powers of creativity and innovation, cultural appreciation, sense of social responsibility and understanding of the modern world."

We can analyse the nature of the inputs of the educational system in the developed and the developing countries of Europe, Asia, Africa and Latin America and the output of the educational system, what is going into the system and is going outside the system, and conclude that there is a crisis in education in all countries in the form of an imbalance between education and environment. For meeting this imbalance the book referred to above suggests a strategy.

Another Illustrative Model

(This model is based on a suggestion made in a paper "The Application of systems analysis to educational planning" by Roy E. Love and Donald W. Kyle in comparative Education Review).

I. Decisions regarding allocation of resources to education *vis-a-vis* other socio-economic sectors in order to achieve the best overall plan for social and economic development.

II. Decisions regarding educational policy in which problems like allocation of resources within education among the broad alternative educational objectives and paths are considered.

III. Decisions within the education sector in regard to matters like choice of media and technologies to implement educational programmes. One can call this the core in decision making in education because it is the aggregates of such methods and programmes which will determine how well policies and plans are being supported.

IV. Decisions regarding alternative methods of implementing educational decisions and ensuring the efficient operation and management of the educational system.

According to the writer of the above paper on which the model is based only decisions of the kind in II and III lend themselves to systems analysis. This, however, is not the case. In an earlier chapter we have referred to the application of systems analysis based on optimality analysis for the educational system of Nigeria by Prof. S. Bowles in which both the nature of the process of production in education and the use of educated labour in the economy have been considered.

In applying the system analysis in educational planning Mr. Roy E. Love and D.W. Kyle recognise the following nine steps :

(1) Determining the goals of educational planning.
(2) Determining the scope of the planning problem to be considered.
(3) Determining an objective function.
(4) Identifying the most useful conceptual framework.
(5) Constructing an analysis model.
(6) Developing the measurement model.
(7) Testing the model.
(8) Generating and evaluating alternative solutions.
(9) Implementing the decisions.

The following is the actual example as applied to Turkey.

Example Analysis

Goals	"...to aid the process of planning for education and for labour-market policies..."
Scope	Viewpoint : Turkey Time Horizon : 1960-64
Objective Function	No explicit objective function described, rather the pattern of growth of school population and levels of education in general population.

Conceptual Framework	People progress through the education system into classes of vocational skills on a discrete time passage basis. The stock of persons in particular grade or vocation is dependent on production and the stock in other classes.
Analysis Model	Six, nine and thirteen (three models) linear difference equations expressing stocks of grade levels and skills as functions of other variables, which are solved iteratively through time.
Measurement Model	Rate of advancement and attribution in education system are averaged measurements of school enrolment from school year 1954-55 to 1959-60.
Testing	Comparison of predicted school enrolment levels with actual enrolments.
Generation of Alternatives	Model is descriptive rather than predictive ; hence, no alternative tested.

Network Analysis

Network Analysis is the name used to describe a management technique formerly called Critical Path Analysis (CPA), Critical Path Method (CPM) and Programme Evaluation and Review Technique (PERT). This technique has evolved rapidly since 1957 and it has been found very useful in planning, scheduling and controlling of very complex operations in industry.

A Brief Description of Network Analysis

Network Analysis requires logical thought, a list of activities which will occur in the operation and knowledge of the symbolism used to express activities and their inter-relationships or dependencies on a plan often called an arrow diagram. Activities (tasks, decisions, behaviours, etc.) are represented by arrows going usually from left to right on the diagram, whose length is not proportional to the time taken by the activity. Completion of one activity and start of a following activity is

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represented by a circle or node and is called an event. Events are assumed to be instantaneous. A sequence or concurrence of activities is shown in the construction of the network and simple arithmetical calculations using estimated times of activities permit the "critical path" through the network to be isolated and then the estimated time for the whole project to be determined. Inspection of the network shows that some activities are "critical" and must keep to schedule whilst others have float time (elbow room) associated with them. Resources which are required may be calculated quite simply by transferring information from the network to a Gantt (bar) chart. Using PERT programmes, large networks (over 200 activities) can be stored in computors which will check for errors of logic, calculate critical path and float times, transform times to calender dates, issue resource allocations and so forth. Dialogue between management and computor is possible and changes in a plan or policy quickly allowed for (Lockyer, 1964 ; Battersby, 1964).

It will be helpful to recognise 2 extreme types of network —a type where the project will only be carried out once such as the amalgamation of 2 schools or opening a new one. The second category is one where some administrative procedure has to be repeated at certain intervals of time *e.g.*, the production of a college prospectus.

10

Educational Planning and Budgeting

Relationship between Planning and Budgeting

The question of the proper relationship between planning and budgeting has recently received attention in India. Plans for economic development are for five years or more while the budgets have to be presented to the Parliament every year and sanction obtained for spending the money.

There is likely to be lack of integration between planning and budgeting though every care is ensured to prevent this by having working groups and annual plans. The budget has to accommodate within it not merely the expenditure on account of the plan but also the non-plan expenditure. For instance, in 1967-68 the combined total expenditure of the central and State Governments was Rs. 6,543/- crores out of which Rs. 2,714 crores was non-development and Rs. 3,829 crores for developmental i.e., about 1/3 of the total expenditure. Thus while the Governmental sector was able to appropriate 23% of the National Product, 8% of the National Product went into plan and 15% to non-plan outside the plan sector. The question can very well be raised whether the planning process can be very effective when such a large size of the expenditure goes outside the planning framework. There are the following additional difficulties in making use of the budget documents in the context of planning :

(1) They are too complicated and the expenses relating to one project will be found in many heads of account.

(2) For economic analysis on the basis of cost benefit analysis, evaluation of the expenditure on a single project becomes difficult, if not impossible.

(3) The distinction between recurring and capital expenditure is essential in economic analysis and it

cannot be separated easily from the budgets. On account of these drawbacks of the existing methods of budgeting, in many countries of the world there is a move to have a new approach to budgeting which is called performance budgeting or programme budgeting or performance and programme budgeting system. Suggestions for reforms on the above lines have been made for all departments of the Government and not to the department of education alone. The major difference between the traditional budgeting and new budgeting is in regard to its orientation. Control over spending is the primary objective of traditional budgeting. Performance budgeting is oriented towards management and it is functional. The object of this kind of budgeting is to help performance to be evaluated. Certain ministries of the Government of India are at present preparing their budgets in this form also along with traditional forms. This is described as in the essence a work plan specifying the concrete objective to be achieved by the government during the financial year.

It is formulated on the basis of the work to be done or services to be provided by the government and presents these together with their costs. Programme budgeting is an approach based on the formulation of programmes. Planning, programming and budgeting system is an approach which is oriented to planning.

The programme budgeting has three main aspects; they are :

(1) Structural aspects
(2) Analytical aspects
(3) Administrative and organisational aspects.

A. Structural Aspects : Programme budget is a device for structuring and organising expenditure information. The following things will be done in regard to the cost.

1. Arrange cost data in terms of programmes and sub-programmes that can be :
    - (*a*) Oriented to specific outputs and goals, which can be expressed, at least partially, in quantified terms.
    - (*b*) Are clearly delineated, with a minimum overlapping and interaction with other programmes and which consider components that are in close competition with each other.
    - (*c*) Are broken down into operationally useful building blocks (manpower, material, equipment, etc.) which can be combined to yield various alternative sub-programmes.
2. Contains expenditure and/or obligational authority information, with the addition of other social cost information where possible.
3. Covers an extended time horizon ; i.e., contains data for as long as five years into the future.

B. Analytical Aspects : Involves use of analytical tools in systematically examining alternative courses of action and their implications.

1. Example of one such tool : Benefit-cost analysis, which uses expenditure information appearing in the programme budget, plus additional information (indirect costs, benefits, spillovers).
2. Analysis also includes consideration of various uncertainties and their implications for planning budgeting as well as investigations into objectives and different ways of reaching them.

C. Administrative and Organisational Aspects : Provides a basis for administering, enforcing and revising allocative decision.

We have given a model of PPBS or output budgeting as it has been suggested by a committee on output budgeting for U.K. for the department of education and service.

P.P.B.S. or Output Budgeting Proposed for the Department of Education and Science in Britain

1. Major Programmes in Education

D. A.1. compulsory education.
A.2. nursery education.
A.3. education for the 15-year-old.
A.4. education for the 16-19-year-old.
A.5. higher education (below first degree level)
A.6. higher education (first degree level)
A.7. postgraduate education.
A.8. educational infrastructure.

2. Common Programmes of all Major Programmes

Major Programmes A.1—A.4	*All Programmes*	*Major Programmes A.5—A.7*
	-1. Maintenance of existing pattern and scale of provision	
	-11. For existing numbers	
	-12. For population change (assuming existing proportions receive different types of education)	
-13. For population shift		
	-2. Reduction of cost of provision while maintaining existing "standards" of output	
	-3. Change in the proportion of the age group receiving education.	

Major Programmes A.1—A.4	*All Programmes*	*Major Programmes A.5—A.7*
	-4. Changes in the proportion in different types of institution or taking different subjects.	
	-5. Changes in the standards and quality of accommodation (including residence)	
-6. Changes in the availability and training.		-6. Changes in staffing ratios and standards
-7. Improvement of teaching methods and curriculum		-7. Changes in the length of courses
	-8. Other changes in the pattern of inputs	
	-9. Changes in the incidence of costs	
	-0. Other (*i.e.*, inputs allocable to objective of the major programme, but not to particular programmes).	

3. Framework of Programmes under Major Programme A.1.—Compulsory Education :

E. **Main Objective** : To provide the highest posssible standard of education, according to the child's age, aptitude and ability, during the present years of compulsory schooling.

4. Programme Budget for Major Project A.1.—Compulsory Education

PUBLIC EXPENDITURE 1968-69—1972-73

Programmes	*Intermediate Output (000's)*
COMPULSORY EDUCATION	
11 Existing Pattern and Scale of Provision	
111 For existing numbers	Existing pupils
112 For population change	Additional pupils
113 For population shift	(*i*) New places provided
141 Secondary Reorganisation Educational Priority Areas	(*ii*) Places classed in existing schools
161 Improvement in pupil/teacher ratios	Change in number of pupils in comprehensive schools Pupils in improved schools in e.p.a.s.
Other changes	Pupil/teacher ratios

Measures or Indicators Success

(*a*) *Intra Education*	(*b*) *Extra Education*
Reading Tests Mathematical ability Examination results	Employers' assessments of quality of 15-year-old school leavers.
Inspectors' assessments Social adjustment indicators *e.g.*, truancy, juvenile delinquency, before leaving school	Social adjustment indicators, *e.g.*, social behaviour of 15-year-old leavers after leaving school
Particular Policy objectives	Appreciation of cultural values by school leavers

	Programme No.	*Additional Measures of Indicators of success*
To reduce social and other inequalities, and to provide greater equality of opportunity by re-organisation of secondary schools	141	Social adjustment indicators for parents and families, as well as the children Educational performance, particularly of the less-gifted.
To improve the standards of provision in the Educational Priorities Areas	151 1611 & 1621	
To improve the staff/pupils ratio to ( ) by 19 ( )	161	Change in staff/pupil ratio

Coverage

In England and Wales :

(*a*) Primary Schools (excluding Nursery Classes)
(*b*) Secondary Schools, up to present compulsory school-leaving age.
(*c*) Special School, excluding classes for age group outside the normal age of compulsory schooling.
(*d*) Colleges and Departments of Education—that part of current and capital expenditure that can be attributed to providing teachers for this age group.
(*e*) Schools Broadcasts and T.V. (part)

Branches of D.E.S. responsible

Schools
Architects and Buildings
Teachers I and II
Special Services

11

Economic Analysis and New Educational Techniques

In economics technology refers specifically to the method of combining the factors of production like land, labour and capital. The techniques of production adopted are the result of the development of technology. Thus in a society where capital is available in plenty, capital intensive methods of production are used. In societies where capital is not available in plenty as in countries like India, it is suggested that labour intensive and capital saving techniques of production should be used. It is argued by those who are interested in economic growth of a country that appropriate technologies should be used.

Application of the Concept to Education

We can apply the concept of technology to the field of education. The decision to introduce a new technology can be made on the same basis on which such decisions are made in the field of industrial production.

Education is a labour intensive activity. It requires the use of a large number of people as teachers and administrators. Thus the existing technology in education is a labour intensive one. There is a case for making it more capital intensive if the same result in education can be achieved in a less costly way. If expansion of primary education in India is essential for raising productivity and if there are not sufficient number of trained teachers for teaching students at the primary level, then there is a case for going in for television for giving training to a sufficiently large number of teachers for primary schools. Taking another example if there are a large number of students taking an examination evaluating their answer papers, tabulating the results and announcing the results will take too large a time and in order to reduce the time computer can be used at the appropriate phases. One can think of any sector of activity in the field of educational administration and management and new techniques can be adopted taking into account the advantages arising therefrom and the factor endowment in a given situation.

Application of Systems Approach to the Planning of Introducing a New Technology—let us say Televised Teaching

The first step in such a systems approach is to define the objective. It can be :

(*a*) raising the level of teaching in the classes at primary levels which are done by poorly qualified teachers.

(*b*) upgrading the large number of poorly qualified teachers who teach the primary classes.

The next step is to identify the inputs needed to accomplish the task of giving better training to the teachers. New teacher training institutions have to be created which require materials and teachers.

The third step is to decide on the process. Suppose the number of teachers who have to be trained are so large that the required resources are not available then a decision has to be taken as to the method to be adopted—or the technology to be adopted. It may be decided to have T.V. teaching for training a large number of teachers.

The costs required for introducing T.V. are :

(1) production costs (including administration)
(2) transmission (or distribution)
(3) Reception.

The above are the operating costs and they are needed for keeping the project running-capital investments are expenditures for equipment, buildings, electrification, furniture and similar items.

The following are the items of cost which could be assumed for the purpose of *illustration*.

(1) cost for one hour of educational television—Rs. 900/- for production and administration.
(2) cost of transmission—Rs. 260/-
(3) annual running of one receiver—Rs. 170/- which includes all maintenance and capital charges.

Table XXVI
Projected Costs (*in dollars*)

	1st year	*2nd year*
Programme production and administration	81,000	1,08,000
Transmission of original broadcast	23,400	31,200
Repeats for English	15,600	15,600
Repeats for Science	23,400	15,600
Total, production and transmission	1,43,400	1,70,400
Capital charges, production and transmission	70,000	70,000
Reception cost, 550 receivers, including capital charges	93,500	93,500

Given the above cost figures according to systems analysis. We have to decide on the service that is going to be provided the number of students or classes to whom it is to be provided and the place where it is to be given. Let us consider each one of these items.

(1) Service that is going to be provided—Improving teaching of English and introducing teaching of Science in primary classes in grades 5 and 6.
(2) In the region that the existing T.V. can cover, there are 500 primary schools; 250 schools have 1 stream, 200 have 2 streams and 50 have more than 3 streams.

There are 35 pupils in every class.

12

Economic Analysis and Vocational and Technical Education

Vocational and technical education is given to students in order to enable them to work in industries, agriculture or other activities which come under tertiary sector since these are the activities which constitute the essence of economic development ; the relationship between vocational and technical education and economic analysis is very close. In particular we can regard vocationalisation of a certain level of education as a project and show what all steps are required in order to prepare such a project and of what use economic analysis can be made.

The following can be identified as the steps needed :

(1) An assessment of the existing programmes of vocational and technical education with reference to the employment or unemployment of the output from such courses. In regard to those who are unemployed they can be classified by kinds of qualifications they have and a study made as to the causes for their unemployment. In regard to these employed the quality of the training should be assessed with reference to the opinions of the employers and the actual productivity of the persons who have received the training.

The Present Method of Converting the Manpower Requirements into the Outputs from Educational System

As we have already stated the manpower planner decides on the kinds of manpower needed and they are converted into the categories of educational preparation on the following basis :

Class A. Occupations for which a university education or an advanced teachers' college degree or its equivalent would be normally required.

Class B. Occupations for which 2 or 3 years of education beyond the secondary level may be needed.

Class C. Occupations for which a secondary school education (technical or academic) or its equivalent would normally be required.

Class D. All occupations not included in Class A, B or C. In Sweden a system was used with classification of 300 types of education. (H.S. Parnes, Forecasting Educational Needs for Economic and Social Development, O.E.C.D., Paris 1962—P. 26).

Defects of the above approach

(1) The above approach assumes that broad categories of education are adequately specific to indicate the type of educational programme necessary to prepare persons for certain occupations.

(2) It does not take into account the consideration as to whether the existing programmes of vocational and technical education are appropriate.

Economic analysis can be used for finding out in what way an accurate determination be made of the kind and amount of education required to produce graduates who passes sufficient skill in appropriate fields of knowledge to perform in an acceptable way in all occupation (such an assessment has been made for Mediterranean Region countries in the study "Educational Preparation of Skilled Manpower" by B.P. Saunders)

(3) A survey of the opportunities of employment that are likely to arise in future at the National, State or District level.

An action-oriented research project for Osmanabad District is already in progress in Maharashtra State. The following table shows the change in the pattern of employment in favour of the tertiary sector.

Table XXVII

Percentage Distribution of Civilian Employment Among Economic Sectors in 18 Countries

	about 1950			about 1955			about 1960			about 1962		
	Primary	*Secondary*	*Tertiary*	*Primary*	*Secondary*	*Tertiary*	*Primary*	*Secondary*	*Tertiary*	*Primary*	*Secondary*	*Tertiary*
Austria	53·0	42·1	24·9	...	...	...	...	...	...	...	...	...
Belgium	11·1	54·4	34·5	9·3	54·5	36·2	7·6	53·6	38·8	6·9	53·5	39·6
France	...	...	...	27·0	42·9	30·1	22·7	45·3	32·0	20·7	45·8	33·5
Italy	...	...	...	...	...	...	31·1	42·6	26·3	28·0	45·6	26·4
Greece	...	...	...	...	...	...	...	...	...	56·0	22·9	21·1
Iceland	...	...	...	...	...	...	24·7	46·5	28·8	...	...	...
Germany (FR)	24·2	48·2	27·1	...	...	...	...	...	...	13·9	53·7	32·4
Netherland	14·3	48·4	37·5	12·3	49·0	38·7	10·3	49·0	40·7	9·8	49·0	41·2
Norway	30·5	43·6	25·9	26·2	46·4	27·4	23·2	47·1	29·7	21·6	47·6	30·8
Portugal	...	...	...	...	...	...	44·2	33·0	22·8	...	...	...
Spain	...	...	...	...	...	...	41·9	36·3	21·8	...	...	...
Sweden	...	...	...	...	...	...	...	...	...	13·2	47·4	39·4
Switzerland	16·5	50·6	32·9	...	...	...	11·2	55·5	33·3	...	...	...
Turkey	...	...	...	77·4	9·8	12·8	74·9	11·7	13·4	...	...	...
United Kingdom	5·6	55·7	38·7	4·9	56·4	38·7	4·4	55·6	40·0	4·0	54·9	41·1
Canada	22·9	43·1	34·0	17·8	42·2	40·0	13·2	41·9	44·9	12·1	41·9	46·0
United States	13·5	40·1	46·4	11·1	40·7	48·2	9·3	38·4	52·3	8·5	37·9	53·6
Japan	...	...	...	40·2	28·6	31·2	32·5	33·2	34·3	29·9	36·2	33·9

(O.E.C.D. Observe February, 1967). The member countries of O.E.C.D. are examining the implications of this shift from an industrial to service economy for policy making.

(4) Vocational and technical education involves high per pupil cost. Economic analysis can help to find out whether it is worthwhile giving the training through the Annual system or on the job. It is not easy to answer this question because certain employers need people with good education rather than specific training (studies made in Jordan).

These are only some illustrations of the kind of use to which economic analysis can be put before a project on vocationalization of education is implemented. Other steps needed as preparation for a project on vocationalization are :

(*i*) decisions regarding location of such institutions. It will be an advantage to take into account proximity to established industries.
(*ii*) Construction of building schedules.
(*iii*) Training and recruitment of teachers.
(*iv*) Supply of books, materials and equipment.
(*v*) Provision of money for recurring and capital expenditure.
(*vi*) Enlisting the co-operation of industries and spreading the information to students and parents through vocational guidance.

Application of Cost Benefits Technique and PERT in the Preparation of a Project on Vocationalization

Cost benefit technique could be used even before it is decided to have the project on vocationalization for helping a decision as to whether the vocational education is to be given through formal education or on the job training.

After it is decided to have the project in order to know by what time the project can be completed, we can apply PERT. This is also called net work analysis (as it is explained elsewhere). For this purpose we can divide the project into its components like the setting up of buildings or training of teachers or placing orders for the equipment. For each of the activities there can be estimates of time.

Optimistic time

The minimum possible time in which the activity can be completed *i.e.*, the time it would take to complete the activity if everything proceeded better than expected.

Most likely time

The best estimate of the period of time in which the activities can be accomplished.

Pessimistic time

The maximum possible period of time it would take to accomplish the activities, *i.e.*, the time it would take if everything went wrong.

Suppose 'A', is the optimistic estimate, 'M' is the pessimistic estimate, then 'te' represents a statistical mean or average value of the 3 time estimates. 'te' is the average time that the activity would consume if it were repeated many times.

13

Recent Trends in Economics of Education and Economics of Educational Planning

In this survey, the developments in economics of education and economics of educational planning since 1960 are discussed. It is indeed difficult to cover the developments that have taken place in this field because of the rapidity with which developments have taken place and the coverage of these developments. However, attempt is made to refer to the most significant developments in the field of economics of education and economics of educational planning.

It will be helpful to begin by distinguishing between economics of education and economics of educational planning. Economics of education has now become a field of study in its own right and has many facets. The essential idea underlying economics of education is that education is an investment and, therefore, all aspects of the activity of education will have to be subject to the criteria underlying an investment activity. But economics of educational planning is concerned more with educational planning as it has been going on for many years in several countries. One can say that in economics of education we are trying to ensure that resources are utilised in full without, however, limiting to the considerations to which theories of economic growth will limit themselves. In fact, in this effort the view that education is an investment is not fully reflected because the developments in economics of education have not taken place to the same extent. A good deal of empirical work in economics of education has to take place before the view that education is an investment can be fully reflected in the theory and practice of educational planning. In the meantime, the economic aspects of educational planning are being fully discussed.

The Growth of Literature in Economics of Education and Educational Planning

In 1961, under the auspices of the Organisation of Economic Co-operation and Development, a policy conference on economic growth and investment in education took place in Washington. This signified the emergence of thinking of education as an investment and an attempt to apply that in practice at the policy level. Four publications resulted from this conference on economic growth and investment in education.

In 1963, the International Economic Association discussed economics of education at the professional level of theoretical economics. The papers presented to this International Economic Association discussed the following problems :

(1) Measurement of contribution of education to economic growth
(2) Measurement of the demands of industry on education
(3) Cost and expenditure on education
(4) Balance between various forms of education
(5) The demands of agriculture for education, and
(6) Measurement of the overall demand for education.

The papers presented to this conference of the International Economic Association and the discussion that took place constitute an important addition to the literature on economics of education.

The Organisation for Economic Co-operation and Development had set up a study group on economics of education. In this study group economists from all over the world were associated and so far five publications have resulted from their efforts. They are : (1) the economic aspects of higher education, (2) the residual factor and economic growth, (3) organisational problems in planning educational development, (4) financing of education for economic growth, and (5) the social aspects of education.

UNESCO has also been taking steps in the development of economics of education and its application to educational planning. The Karachi Plan and the Tokyo Plan for the attainment of universal primary education in all countries of Asia naturally attracted the attention of all the member countries to the financial magnitude involved in the attainment of universal primary education by 1980. In order to discuss the financial aspect of this problem, a Regional Seminar on Investment in Education was held in Bangkok in April, 1964 which was subsequently published in 1967.

In the meantime, Organisation for Economic Co-operation and Development has attempted to apply certain principles arising from detailed considerations of economics of education to the Mediterranean region countries. For six countries of the Mediterranean region OECD attempted to plan for their educational development. Under the auspices of the educational investment and planning programme of the Committee for Scientific and Technical Personnel of the OECD, draft reports have come out for Netherlands and Sweden which have attempted to apply the view that education is an investment to the actual planning of education in these two countries.

In addition, in recent years, especially after 1960, Governments of different countries have appointed National Committee for planning of their education and all these committees have taken advantage of the developments in economics of education in varying degrees. One of the reports on educational reform for Ireland had called its report "Investment in Education". The Robbins Committee on Higher Education in Britain got the involvement of a number of economists for their report on education and it also resulted in the setting up of a unit for the study of economics and statistics of higher education. The Education Commission of India also partly utilised the findings of a group of economists for planning the enrolment in the coming 20 years on the basis of the reports of a unit of the London School of Economics and the Indian Statistical Institute. The World Year Book of Education in 1967 has, in a sense, embodied the findings of the economics of education in their actual application to educational planning. Thus the field of economics of education and educational planning has been growing since 1960 and a good part of the work in economics of education has now got institutionalised.

Measurement of the Contribution of Education to Economic Growth

Between 1950 and 1960 theoretical research in economics of education was mainly interested in measuring the exact contribution of education to economic growth in countries like U.S.A. and U.K. After 1960, the major interest has been to find out whether any educational structure is common to all countries in their corresponding stages of economic growth and how educational structure changes under economic growth. The major concern in all these research studies has been to make use of educational policy in the developing countries for the purpose of accelerating their economic growth. For this purpose, the experience of many countries have been examined both on a cross-sectional basis and also for the same country on the basis of time series analysis. In order to find out the education effort, the indicators that have been used are literacy of population *i.e.*, 40% literacy of the population or the percentage of GNP devoted to education or enrolments of the population of different age-groups at primary, secondary and higher levels of education or population enrolled in secondary education per thousand primary level students or the number of persons at the primary level per thousand of population. Making use of one or the other of the above indicators of educational effort attempt has been made to find out the possibility of accelerating economic growth with that kind and amount of educational effort.

Education as the Cause or the Result of Economic Growth

In the course of these researches, it was also noted that education can be the cause or the result of economic growth. Therefore, the way in which the demand for education has been growing as a result of economic growth has also been investigated alongside with the manner in which educational system has responded to this increase in demand. In recent years, in order to find out the relationship between education and economic growth the method adopted is to study the educational level of labour force and measure the stock of education on the basis of expenditure invested in education. In this approach, growth in national income will be explained instead of in terms of physical capital and labour also in terms of the stock of education.

Even in this approach, the difficulty is that the same amount of education can have different impact on economic growth if other kinds of capital are not adequately raised. Thus a study has shown that for Japan if labour and stock of education are constant, one percent increase in physical capital will bring about 11% increase in national income. If capital and the stock of education are constant, one percent increase in labour brings and about ·32% increase in national income. If capital and labour are constant, one percent increase in the stock of education bring about ·50% in national income. Studies of these kinds which will be helpful in making decisions regarding investment in education alongside with investment in other kinds of capital.

It is now realised that the impact of education on economic growth is complicated and a study about that is possible only on the basis of an inter-disciplinary approach. No simple farmework of analysis will be sufficient for this purpose. Therefore, some economists have now begun to look at knowledge and learning and their relationship to economic growth, so that the policy maker can decide on giving this kind of knowledge.

Models for Education Planning

Even though it has not been easy to identify the precise contribution of education to economic growth, the importance of education to economic growth is accepted all over the world. Therefore, many models of the economics of countries have explicitly incorporated inputs of labour of various skills or educational levels. Such models have been developed for educational sector alone. In such models, the size of the educational sector is determined on the basis of the amount of resources going into education expressed as a percentage of GNP or enrolments in different levels of education.

Such models are highly simplified accounts of realities. They throw light on the question of optimum allocation of resources to education and also make explicit the inter-relationship within the educational s stem. They make clear the implications of alternative policy choices and point out the best method of attaining these objectives. Prof. Tinbergen and Correa put forward such models for educational planning and many new models have come into being in order to indicate the optimum allocation of resources to education.

Asian model looks at the school education as a system through which students will flow from one grade to the other. Usually, while deciding educational policy, only the feasibility of one set of targets is discussed. But with the help of this kind of system analysis which is envisaged in Asian Model and the use of computer, it is possible to have a wide range of choices. The implications of a number of alternatives will become clear to the policy maker. There is widespread realisation of the usefulness of these models and in many countries efforts are being made to visualise the future of their educational system on the basis of these models which also have been computerised. Since some of these models are mathematical ones a number of mathematicians have also entered into the field of specialisation.

Other Economic Appproaches to Educational Planning

In addition to the planning models discussed above, there are three additional approaches to educational planning which are used in practice to a varying degree. They are social demand approach, manpower and rate of return approach.

Social Demand Approach

Traditionally, this method has been adopted for educational planning on the ground that the demand for education of the people will have to be satisfied. Robbins Committee on Higher Education in U.K. adopted this method for deciding the total number of places in their higher education system, even though for distribution among different subjects it relied on manpower approach. Attempts are being made to improve the forecast for demand for education on the basis of growth in income and urbanisation resulting from economic growth.

Manpower Approach

While the social demand approach has been adopted for many years now, manpower approach to educational planning is being adopted only in recent years. In all the countries of the world provisions exist for forecasting the manpower required for enabling the economy to grow at given rates. But the method of forecasting needs considerable amount of improvement. Therefore, a number of suggestions have been put forward to improve the forecasting techniques and relating them in a better way to the rate of growth of the economy. In particular, efforts are being made to determine the education required in the context of economic growth. It now seems to be composed of three elements—(1) education required to keep pace with the growth of labour force as a whole (2) education required to allow for the necessary adjustments in the occupational distribution of labour force, and (3) education required because of changes in the kinds of education associated with these occupations. Efforts are also being made to envisage the manpower required on the basis of productivity changes in different sectors of the economy.

Harbison's Human Resources Development Strategy

In this approach, much more than the quantitative targets of projections for formal education is taken into account. Harbison's Human Resources Strategy consists in the development of human resources both in quantitative and qualitative terms looking at the problems from the growth of population in developing countries, unemployment and underemployment shortage of skills in certain sectors and surplus in others to the inadequate or under-developed organisations and institutions for mobilising human efforts and the need for appropriate incentives for persons to take to certain activities. The advantage of this approach is that it takes into account all the requirements for human Resources Development together. The entire field of human resources development is viewed as one system comparable to the system of generation of electricity. Schools, universities and training institutions will be skill generating centres. The systems analysis approach will make it easier to identify the major problem areas and enable the examination of inter-relationship between various manpower and educational problems.

Rate of Raturns Approach to Educational Planning

Of all the three economic methodologies of educational planning, this has been the least applied in practical planning of education. This, however, does not mean that it is not a useful one. It is one of the very helpful devices for arriving at decisions regarding the amount of investments to be made in education on the basis of the returns that it can yield. According to this approach, investment in education should take place to such an extent that the returns from that investment are equal to the returns from other kinds of investment in physical capital like iron and steel mill, etc. In economic theory, this principle is described as one of equi-marginal returns. In principle the logic underlying this approach to educational planning cannot be denied. But the difficulty arises regarding the way in which the returns from investment in education can be measured. At present, some of the empirical studies in economics have tried to measure the earnings that the educated people are receiving as the basis for the returns from investment in education. But these earnings are not dependent entirely on education. There are innate abilities and the family background and other considerations which are also relevant in determining the returns for educated individual. In addition, there are also intangible and qualitative returns accruing from education. Therefore, it is necessary to consider all the returns from investment in education—quantitative and qualitative, personal and social when the decision on investment in education is considered.

Cost Benefit Criteria

Realising the many sided nature of the returns from education some economists have suggested that the criterion for investment in education should be decided on the basis of this consideration, investment in education will be made after taking into account both the costs and all the benefits arising therefrom.

In education the nature of the product is highly complex and the inputs required are also of many kinds like teachers, buildings and equipment. Generally, planners and administrators have to make decisions taking into account the relative availability of one or the other of the inputs and the importance of the output required. In order to help in process of decision making like this, system analysis has been suggested which can be used as a tool of management, administration and planning of education.

Methods of financing education, the magnitude of finance, the cost of education and the efficiency and productivity of the educational system.

The issues arising in a study of the methods of raising finance for education and the amount of finance devoted to education are discussed in the context of the urgent need for additional finance for education in the developing countries. But the outlook for getting additional finance for education does not seem to be bright because of the poor rate of growth of the developing economies in the sixties of this country. All the same, the need for more resources for education is no less urgent both for accelerating the rate of growth of these economies and for satisfying the growing demand for education. Therefore, a number of issues like the methods of presentation of expenditure on education for facilitating an economic analysis rather than accounting purposes, methods of finding additional sources of finance and the need for and methods of proper cost analysis in education have been discussed.

Since there is shortage of resources for education as well as for other purposes in the developing economics, suggestions are made now for making the maximum use of the limited resources available. In particular, the economic concept of efficiency and productivity is increasingly discussed with reference to the use of resources in education. It is suggested that the maximum use must be made of the limited resources by ensuring that its productivity is not clear when it is used with reference to education and, therefore, attempts are being made to investigate the content of the terms efficiency and productivity in the educational systems of different countries of the world.

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APPENDIX I

Glossary of Terms

I. Cost

Because of its ambiguity the word cost should be carefully defined in each context bearing in mind that the cost in economic sense is always an opportunity cost *i.e.*, the cost of a displaced alternative. We should also distinguish between money outlays and resource costs, recurrent and capital costs, etc.

(1) *Money outlays*, includes all forms of expenditure needed to provide a particular type of education *i.e.*, recurrent expenditure on salaries of teachers and other staff, maintenance replacement of equipment, books, stationery, loan charges, etc.

(2) Capital expenditure on new buildings and equipment.

(3) *Transfer payments* to individuals in the form of scholarships, grants or loans or from one department of the government to another *e.g.*, from Central to State Government.

(4) *Total resource costs*, include the money value of all the real goods and services used to provide education with their value measured by their opportunity cost—that is, the best estimate of the price the resources would command if used in some other sector of the economy instead of education. Resource costs may exceed money outlays insofar as they include the value of any factors provided free (from the point of view if the budget of education) such as unpaid labour for school buildings, rent, etc. In the case of cost benefit analysis, resources costs may include the foregone earnings of students, *i.e.*, the earnings a student

would command if he joined the labour force instead of continuing his education. The opportunity cost of buildings and equipment can be measured in terms of imputed rent, or depreciation *i.e.*, the annual payment needed to cover depreciation and interest on the cost of the capital which can be regarded as the rent that would be paid if schools were hired instead of financed out of capital grants. In calculating resource costs, simple transfer payments like loans or grants should be excluded.

Unit Cost

Unit cost is simply the result of dividing the total cost by the number of units. Units chosen will depend upon the purpose for which the analysis is done. Some of the important items of unit cost are :

(1) Recurrent expenditure per pupil—total current expenditure—the number of pupils enrolled or in average daily attendance or passing out (graduate).

(2) Total cost per pupil—total expenditure including an allowance for the value of capital as well as current expenditure divided by the number of pupils enrolled or in average daily attendance or graduating.

(3) Total cost per graduate (or completer)—the total expenditure on all pupils including dropouts and repeaters divided by the number of successful students who completed the course. (It usually exceeds by a wider margin the total cost per student multiplied by the normal years in the cycle).

(4) Total cost per pupil entering the intended occupation. If a large percentage of the students do not enter the occupation for which they have been trained ; this will be much higher and will be useful for some kinds of analysis.

(5) Capital cost per pupil place the capital cost of a school divided by the total number of pupils it is designed to

accommodate (though it may later on accommodate less or more students).

(6) Capital cost for utilised space is the capital cost divided by the average number of pupils in daily attendance.

In the same way we can calculate the capital cost per class room, capital cost per laboratory hour per pupil.

Cost Benefit Analysis

A method of analysis that seeks to measure the relationship between the total resource costs of a project and the value of all its expected benefits. Ideally the benefits should include both direct and indirect benefits, both economic and non-economic individual and social. But because of the difficulty or impossibility of measuring some of these, cost benefit analysis of education is usually confined to a comparison of costs and estimated direct economic benefits to individuals. Thus education is regarded as a form of investment which produces a steady stream of income in the form of increased life time earnings of educated people. These benefits can then be compared with the total resource costs of the education in order to measure its yield or profitability by means of three measures.

(*a*) The internal rate of return which is the rate of interest that equates the present value of costs and the present value of expected benefits measured by life-time earnings differentiates.

(*b*) The present value of net returns which is the present value of the expected increase stream (=earnings differentiates) minus costs at a particular discount rate.

(*c*) The benefit cost ratio which is the ratio between the present value of the benefits and costs at a particular rate of discount. Cost benefit analysis may be concerned either with social or private costs and benefits. *Social costs* includes all instructional and related costs including the value of buildings plus the value of students' time measured by earnings foregone.

Social benefits are measured by the pre tax earnings differentiates.

Private benefits are measured by post tax earnings differentiates.

For purpose of resources allocation it is usually the social costs and benefits that are relevant, but an analysis of private costs and benefits may help to explain the private demand for education and show the implications of scholarship and subsidy policies.

II. Other Concepts

1. **Consumption**. The process of satisfying a want is called consumption. Satisfying want for food is called consumption of food or satisfying the want for a motor car is called consumption of motor cars.

Accordingly goods are called consumption goods like food or motor cars.

Goods required for producing such consumption goods are called investment goods like iron and steel or bricks.

2. **Production**. The process of producing these goods is called production.

3. **Distribution**. The process of distribution of these goods and service in a society is called distribution.

4. **Value**. When goods and services are exchanged against each other, they are exchanged at prices. The money value of a good *e g*., Rs. 20/- for a chair is called its price. When the value of good is expressed in terms of chairs or other goods it is called its real value, *e.g*., if one chair is equal in value to 15 dozen chalk prices, it is called its real value.

5. The price at which a good is sold in the market is called its market price.

6. If demand exists for a commodity *i.e*., if people are willing to pay a price for a commodity. it is said to have a market *e.g*., people are prepared to pay a price called fees then it is said to have a market. We can examine whether an educated person has a market *i.e*., whether anyone is prepared to employ

a person and give him wages in countries where there is unemployment.

7. **Supply.** The total production that is available in a country in a year is called total supply, *e.g.*, total number of graduates passing in a year is called supply of graduates in that year.

8. Equilibrium is a concept generally used in economics *e.g.*, equilibrium price of a commodity is that which brings supply and demand equal to each other.

APPENDIX II

Basis for the Quantitative Analysis of the Educational System

Several indices related to the educational system are now in use. Examples of them are the teachers/students ratios, the enrolment ratios, etc. These indices are employed both as quantitative descriptions of the quality of a system, and also to make such estimates as the number of teachers needed when the number of students is known.

All these indices measure different aspects of the same system. As a consequence, they must be closely related. Actually, the characteristics of the educational system must give rise to systems of quantitative indices. Any such system should maintain the same relationship with education that the system of business accounts maintains with firms and that national accounts maintain with national economy. Close relationships must also exist among the different indices themselves.

The object of this illustration is to propose one such system of quantitative indices for education. It might be possible to define several others. Only experience with such systems will determine which is the best one for any particular use.

I. FRAMEWORK OF THE QUANTITATIVE ANALYSIS

The following elements will be considered below in the quantification of education :

(*a*) A time table that comprises two elements : number and length of the periods in which the direct interaction of teachers and students takes place, and the content of education, *i.e.*, the subjects taught and learnt ;

(*b*) Teachers and administrative personnel;
(*c*) Buildings and other facilities;
(*d*) Students.

Below, variables will be defined which represent some of the quantitative aspects of these elements: for instance, number of students.

The four elements in the framework can be seen from two points of view. First, the relationships among them can be studied without taking into consideration the passage of time. They are considered as stocks. From the second point of view, the changes in these elements from one period to the next is considered. They are not seen as stocks, but rather as flows. Both of these points of view will be utilised below.

II. THE MAIN ELEMENTS OF THE EDUCATIONAL SYSTEM CONSIDERED AS STOCKS

1. Number of periods of education offered and number of periods of education received

Two variables are the central elements in the analysis of the relationships among time table, teachers, physical facilities and students. They are the number of periods of education offered, and the number of periods of education received.

The following notations will be used:

H=Number of periods of education offered;
N=Number of periods of education received.

Let us first define precisely these two variables. *Number of periods of education offered*: The time table of Central High School (a fictitious school) is presented in Table 1.

In this table it can be seen that this high school is divided into six grades. Some of these grades are divided into sections. The same subject are taught in all sections of the same grade. Thus, all the students in one grade could be combined in order to teach, for example, with a closed television circuit. The conditions are not so simple in the case of sixth grade. There the curricula do not coincide for the three sub-divisions. Students in 6A do not study the same subjects, or with the same intensity as those in 6B. The situation becomes more complex because subjects 7, 8, 17, 21 and 24 are taught to all the students together.

Table 2 is a summary of table 1. It can be seen that the total number of periods offered is 416, *i.e.*, $H=416$.

If data for all the schools of a given educational level in a particular country were available, the value of H for that country could be estimated.

Number of Periods of Education received. The number of periods of education received is the total number of periods attended by the students. Central High School has 555 students and each one of them receives 32 class periods per week, (Table 1) thus, $N=32\times555=17760$.

The following notations will be used below :

S=number of students

h_s=average number of periods per student.

With this notation, we have

(1) $N=h_sS$

2. Relationship between total number of periods of education provided by the school and that received by the students

We have seen that Central High School provides 416 periods of education. On the other hand, the number of periods received by the students is 17760. How is it possible that the total number received is larger than the total number provided ? Simply because several students receive each period provided. Hence we have the following basic relationships.

(2) $N=s_hH$, where s_h=number of students receiving each period.

For Central High School the number of students receiving each period is $s_h=\frac{17760}{416}=42{\cdot}69$.

What is the meaning of the number of students receiving each period ? Two meanings can be given ; one is related to teachers and another if it is related to physical facilities. Let us see how this is done.

3. The total number of periods taught by a school or an educational system is H. This number is equal to the total number of periods taught by the teachers. Hence,

(3) $H=h_t T$, where T=s number of teachers, and

h_t=average number of periods taught by one teacher.

From (1), (2) and (3) we obtain that

(4) $$s_h=\frac{h_s \times S}{h_t \times T}$$

i.e., the number of students per period is a weighted students/teachers ratio. The weight is the ratio between periods per student and periods per teacher. In other words, the number of students per period is the number of students that a teacher faces.

The ratio (4) is more meaningful as an index of quality of education than the unweighted ratio.

(5) $$\frac{S}{T}$$

This is so because the quality of the system, if related at all to the number of students per teacher, must be related to the number of a teacher teaches.

The ratio in (4) also shows the different elements that should be considered in the estimation of the number of teachers required to teach a known number of students. An increment of the number of students can be provided for in several ways : by reducing the number of periods each student receives, *i.e.*, reducing h_s ; or by increasing h_t ; or by increasing T.

If the ratio (5) is used, we are forced to accept the fact that an increment in S can be met only through an increment in T.

Since the estimation of the number of teachers required for a known number of students is one of the central problems in educational planning, the observations made show the value of the ratio (4) for this purpose.

4. Plant and Equipments

As in the case of teachers the total number of periods that the plant and equipment of educational systems are used is H. Hence,

(6) $H = h_r R$, where R = number of class rooms and laboratories (or total number of sq. ft. of construction) and h_r = average number of periods that each room is used.

From (1), (2) and (6) we obtain that

(7) $$s_h = \frac{h_s \times S}{h_r \times R}$$

i.e., the number of students per period is a weighted students/rooms ratio.

The fact that the weighted ratios (3) and (7) are equal is in perfect agreement without intuition. It is obvious that the number of students that a teacher faces must be equal to the number of students in the class room.

Observations similar to these made with respect to the weighted students per teacher ratio can be made with respect to the ratio in (7). Since these observations do not present any problem no further analysis of them will be presented.

The quality between (4) and (7) shows us another fact : it is impossible to change the students per teacher ratio without also changing the students per room ratio. This is a necessary consequence of the relationships between the different factors in education. These relationships should also be considered in educational planning.

Table 1

Time Table for a High School (*Periods Per Week*)

Subject	Grade													
	1a	1b	1c	2a	2b	2c	3a	3b	4a	4b	5	6a	6b	6c
1. National Language	5	5	5	5	5	5	...	...	...	...	...	...	...	...
2. National Literature	...	...	...	...	...	...	5	5	5	5	...	...	...	...
3. World Literature	...	...	...	...	...	...	...	...	...	...	5	5	3	3
4. Mathematics	5	5	5	5	5	5	5	5	5	5	5	2	5	3
5. National History	5	5	5	...	...	...	...	...	...	...	...	...	...	...
6. Continental History	...	...	...	5	5	5	...	...	...	...	...	...	...	...
7. World History	...	...	...	...	...	...	3	3	3	3	3		3	
8. National Geography	5	5	5	...	...	...	...	...	...	...	...		3	
9. Continental Geography	...	...	...	5	5	5	...	...	...	...	...	...	...	...
10. World Geography	...	...	...	...	...	...	3	3	3	3	...	...	...	...
11. Economic and Political Geography	...	...	...	...	...	...	...	...	...	...	3	...	...	...
12. Nature Study	5	5	5	5	5	5	...	...	...	...	...	...	...	...
13. Physics	...	...	...	...	...	...	3	3	4	4	4	...	5	...
14. Chemistry	...	...	...	...	...	...	3	3	4	4	3	...	1	4
15. Anatomy, Physiology, Hygiene	...	...	...	...	...	...	3	3	...	...	...	...	...	...
16. Biology	...	...	...	...	...	...	...	...	3	3	2	...	...	4

17. Civics	...	...	...	...	...	...	...	...	...	...	...		3	
18. Philosophy	...	...	...	...	...	...	...	...	...	...	...	5	2	2
19. Psychology	...	...	...	...	...	...	...	...	...	...	...		3	
20. Logic and Ethics	...	...	...	...	...	...	...	...	...	...	3	...	...	...
21. Foreign Language	3	3	3	3	3	3	3	3	3	3	2		2	
22. Drawing	...	...	...	2	2	2	2	2	...	...	...	...	...	...
23. Social Education	2	2	2	...	...	...	...	...	...	...	...	...	...	...
24. Physical Training	2	2	2	2	2	2	2	2	2	2	2	...	2	...
Total	32	32	32	32	32	32	32	32	32	32	32	32	32	32

Table 2

Central High School : Total Number of Class Periods per week

Grades and Sections	No. of Grades and Sections	Periods per Week per Grade	Total No. of Periods
1A, 1B, 1C 2A, 2B, 2C 3A, 3B 4A, 4B 5	11	32	352
6A, 6B, 6C, apart	3	16	48
6A, 6B, 6C, together	1	16	16
		Total	416

APPENDIX III

An Economic Analysis of the Educational Problems

In all the studies that have been made so far, attention has been concentrated on the methodology for measuring economic growth, productivity and the contribution that education has been making. In the course of preoccupations with these issues, very many educational problems which lend themselves to economic analysis, have been ignored. It is contended here that the greatest contribution that an economic can make to educational planning at the present stage of development is in the following fields. We give below some illustrative problems.

1. **The Enrolment**

All the studies have taken into account enrolment of the relevant age group or enrolment at a certain level per 10,000 of the population. But it is necessary to emphasise that there are high rates of drop-outs, particularly at the primary level. Therefore, it is necessary to sharply distinguish between enrolment ratio and retential ratio. In fact, it is found that in the Asian countries, low level of economic growth is associated with very small rate of retention ratio. Moreover, certain studies have also shown the drop-outs at the primary level or caused by economic factors, referring to the homes of the children. Therefore, the question that arises for consideration is as to why primary level enrolment is not increasing even though facilities in the form of new schools are made available to the children at a distance of not more than a mile.

2. What is the proper indicator of basic education of the population ? Certain level of development is regarded as an infra-structure, but here the question that arises for consideration

is whether one should use adult education or adult literacy ratio or primary education completion ratio.

3. Many economists have not discussed about the nature and purpose of education in detail that have been tried to assess the contribution of education to economic growth. Surely, one cannot maintain that. It is the job of economist to discuss the nature and objective of education but in so far as an adult is being made to assess the contribution of education to economic growth, it is only proper that the objective and the nature of education should have been discussed by economists.

4. Some economists have identified some of the objectives of education as for example Machlup when he tried to assess the total educational expenditure in U.S. He regarded education as knowledge creating activity. If we regard that knowledge and information are the primary guidelines of education, then the economist can discuss two issues in this context : (*a*) in what manner certain economies of scale can come in the course of creating this knowledge and spreading this information to the rest of the society, and (*b*) are there also economies of scale not doing this ? In this manner, education can contribute to economic growth in two ways :

- (*i*) an increase in the total stock of knowledge in a communicy by the transmission of existing knowledge to a larger number of people,
- (*ii*) an increase in the knowledge stock through the discovery or introduction of new knowledge. *i.e.*, a concept of education. The questions that arise for consideration are : whether or not the available knowledge is fully utilised and whether education is producing enough people with the proper knowledge needed for present and future production.

5. Whether or not there is scope or need for introducing some knowledge which is available abroad into the country ? In addition to the knowledge creasing aspect of education, there are the dynamic aspects of education which should also be taken into account. As a result of such dynamic aspects peoples' attitudes and emphasis may also indicate a change.

There are a number of issues regarding the extent of education which lend themselves this to economic analysis. They are : (*i*) determinants of educational expenditure, (*ii*) the substitution between private and public expenditure on education, (*iii*) centralisation *vs.* decentralisation, (*iv*) cost functions for schools which tries to relate educational inputs to educational outputs, and (*v*) other economic properties of expenditure on education.

When we try to measure the contribution of education to economic growth by taking into account the educational structure of the labour force, levels of per capita income and distribution of the population among the different economic sectors, we can adopt two methods, (*i*) comparing the position of different countries, and (*ii*) comparing the position of different countries on the basis of the stock of manpower with different levels of education. A recent study by Netherland Economic Institute has attempted to compare the stock of manpower with different levels of education with some of the indicators of economic development like per capita income.

APPENDIX IV

Education and Economic Growth of Asian Countries

Many studies have been made to assess the contribution of education to economic growth. They have made use of different indicators of educational development – enrolment ratios of the concerned age group of population, enrolment in primary, secondary or higher levels per 10,000 of population, percentage of gross national product or government budget or per capita expenditure on education. Some of the studies have made use of indicators for economic growth different from the commonly accepted one or per capita income like the electricity consumed, etc. A smaller number of these studies have also made use of the educational structure of the labour force in the different sectors, and tried to relate them with productivity.

These studies have tried to compare the position of different countries at a certain point of time – cross-sectional studies or tried to compare the position of the same country over a long period of time. Certain policy conclusions also are given either in regard to the expenditure to be incurred on education or the amount to be divided to primary, secondary or higher levels of education. Thus, it has been said that public expenditure on education must be related to the per capita income of the country under consideration or the districts, the size of the age group of the concerned population and the density of population in that area.

Another study, in the light of a comparison of enrolment at the primary level per 10,000 of total population in 37 countries has suggested that a developing country should begin with concentrated effort on expansion of primary education for first ten years and then begin to make efforts for expanding secondary education. In the first ten years, the enrolment in primary education will exceed ten per cent of the total population limit and after another five years, enrolment in the secondary level will increase from 0·5 to 10 per cent. In the final ten years, the emphasis could be fixed on expanding university enrolment from 0·075 per cent to 0·3 per cent of the total population. Such a policy prescription is based on the impact of education on economic growth of countries which have already undergone development.

On the basis of such a study, even a prediction is made regarding the prospects of growth for 1960s. and 1970s. On the basis of this study there are very good prospects for growth in terms of recent increases and raising all their enrolments in France, Ireland, Netherlands, Sweden, Canada and Rumania as well as Japan, Australia and New Zealand.

For Austria, Belgium, Denmark, Germany, USA, Russia, Cuba, Mexico and Venezuella, outlook is said to be good. For Great Britain, Switzerland, Bulgaria and Czechoslovakia, outlook is said to be fair ; for India and Uruguay the outlook is said to be poor.

None of them have been able to provide solution to the problem of causal and effect relationship between education and economic growth. They have only tried to find out the correlation which exist between the two variables of educational development and economic growth. And this does not mean causation. But unless and until this solution is available, the planners will have to make use of the traditional methods to which they are accustomed for allocating money to education or distributing money for different levels of education or setting up targets for enrolments.

It is argued in this paper that no study will be able to help the planners in their work unless the indices of economic development that it uses includes not only GNP per head but also the distribution of labour force by economic sectors. By addition of such indices, the common size of educated population which corresponds to countries at different stages of economic development and industrial structure of labour force might be found.

In using educational policy for economic growth, further difficulties arise because education is both consumption as well as investment. As an investment good, it can be used only jointly with other factors of production like capital (of course there are instances of countries which are known to have used capital and education in a complementary way, *i.e.*, a lower level of education being made good for by a higher level of capital accumulation and *vice versa*.) That is why in Japan and in Soviet Russia, the contribution of education to economic growth is estimated jointly with capital and labour. The figures of national income, capital, labour and stock of education from 1905 to 1960 has been used for calculating the position in Japan. It was found that (*i*) if labour and stock of education were constant, one per cent increase in capital will bring about 0·11 per cent increase in national income, (*ii*) if capital and stock of education are constant, one per cent increase in labour will bring about 0·32 per cent increase in national income, and (*iii*) if capital and labour are constant, one per cent increase in the stock of education will bring about 0·50 per cent increase in national income.

During 1905 to 1960 in Japan, national income increased by 4·1 per cent per annum, capital by 3·5 per cent, labour by one per cent, stock of education by 5·7 per cent. Therefore, the annual national income increase rate of 4·1 per cent in Japan is assumed to be made up of (*i*) increase in capital, which is equal to $3 \cdot 5 \times 0 \cdot 109$ which is equal to 0·39 (9·5 per cent), (*ii*) increase in labour $1 \times 0 \cdot 318$ which is equal to 0·32 (7·8 per cent), (*iii*) increase in the stock of education $5 \cdot 7 \times 0 \cdot 498 = 2 \cdot 85$ (69·5 percent) (*iv*) statistical error 0·45 (13·2 per cent), and total 4·1 (100·0 per cent). (*Source* : M. Ushiogi—A Note on the Economics of Education, p. 191. The Developing Economics, March '67.)

According to this calculation, 70 per cent of the increase in the national income of Japan is due to the increase in the stock of education. This is because during the years 1905 to 1960, the stock of education increased by 23 per cent in Japan whereas capital increased by seven times and labour increased two times.

One should not jump to the conclusion that 70 per cent of Japan's economic growth is the effect of education because the influence of educational economic growth is extremely complicated and cannot be measured in the simple framework of analysis.

It would appear that calculations of the kind that have been made in Japan are essential before we are able to speak positively regarding the contributions of education to economic growth. In USSR, Prof. Strumilin had calculated that investment of roughly 1000 million roubles in the decade 1950 to 1960 would produce an annual increase in the national product of the decade 1960 to 1970 of not less than 33,000 million roubles. As a proportion of an increase of national product of 1,46,000 million roubles which is the result of improved productivity arising solely from this investment. In other words, investment in higher education is expected to bring a reward of a 30-fold increase in the decade 1960 to 1970.

All these studies have tried to identify the correlation which leave unexplained the cause and effect relationship. Even the correlation results will have to answer satisfactorily the problem of whether high level of enrolment is the result of economic growth or the cause of economic growth. Thus, in Japan it was found that there was a fairly high correlation between higher education population per 10,000 inhabitants and GNP per head in constant prices. Such a correlation enables us to know the influence working on the educational structure (*i*) an increase in GNP raises, the aspirations of the people and leads to motivation for higher education which is called the demand hypothesis, similarly as the society develops, industries also call for more educated persons which is the supply effect, but there is another aspect of it which also has to be taken into account and that is the way in which the educational system responds to the increased demand for education.

Estimating Education Required for Economic Growth

It is thought that educational planning for economic growth is the same as manpower planning for economic growth. But this is not fully true. Manpower planning for economic growth is only one aspect of educational planning for economic growth.

In order to clarify all the other issues underlying the process of educational planning for economic growth we have to first of all define :—

I. **Economic Growth**. Economic growth is usually defined as a sustained rise in the real income which is the result of a rise in productivity. In national accounting terms this is the definition used and this definition is quite alright when developed economies are considered where national accounting is sufficiently perfect and there is no sector of economic activity where subsistance economy exists.

Economic development is the target of many countries and it is growth plus change. Since education is a device which has got an effect both on the individual and on the society it is not possible for us to depend on growth of GNP alone as an indicator of economic growth.

II. **Education.** When we think of estimating education the question is to be asked as to which indicator we are going to use. Is it enrolment in different levels of education and types of education, or output from the system or the educational structure of the population or the number of pupils per thousand of population, or percentage of GNP spent on education or percentage of budget spent on education or per capita expenditure on education on the basis of density of population. It is found that all these indices have been put forward by different research findings in the context of educational planning for economic growth. We have to give a review of all these findings and then suggest for consideration of the educational planner an index of educational development which he can use for his work.

III. After settling question of the indicator of the development of education we have to decide whether education is to be confined to formal system of education alone, *i.e.*, what is going on in the schools and the colleges or we have to think of the education going on outside in industries in the form of on-the-job training or in the rural areas in the form of social education as part of the programme of community development and extension services. Invariably no thought is given to these issues in considering the impart of education on economic development.

IV. The present practice regarding manpower planning is thought to be the only way of estimating educational requirements for economic growth. This is based on two presumptions mainly which are :—

(*a*) The structure of production is changing rapidly and so also the technology of production and there is likely to be a shortage of certain kinds of skills which will stand in the way of growth of the economy. (This is very much the case in developed economies and manpower planning came into being in these economies as a result of this kind of feeling).

(*b*) Education occupation relationship is more or less adequate and labour force is not growing rapidly and unemployment is not a problem and there is no unorganised sector like agriculture with low productivity and a subsistance sector. This is the case in developed economics and situation in developing economies can be contrasted.

In such countries manpower planning is trying to identify sectors where there is likely to be shortage of skills and is likely to effect the rate of growth of the GDP.

Under-developed Economies. In the Asian countries which are developing the position is very different. There is a large unorganised sector and population and labour force are growing so rapidly and employment opportunities are not growing sufficiently fast. In a country like India, manpower planning has been done with a great deal of sophistication and even here the aim is to make use of labour force, investment efforts and output—three of them together as indicators for estimating the manpower requirement for economic growth. But since the developing economics are different from other countries there are all manners of inter-connections between investment, labour force and output and unless more information is available on these no projection of manpower for economic development is likely to be correct.

It is contended here that manpower required for economic growth has to be treated only as one of the components of the education required for economic growth. The education required for economic growth has to be estimated taking into account all levels and kinds of education both within the formal and outside as well as their relationship with productivity.

Unsatisfactory nature of the present studies on investment in education and economic growth. Many studies have been made trying to indentify the contribution of education to economic growth. They have tried to co-relate the expenditure on education with rate of growth of the economies on cross-sectional basis or for the same country over a long period of time. For measuring the expenditure on education percentage of GNP, or percentage of the Govt. Budget, or per capita expenditure on education have been used. Only few studies have tried to take into account all kinds of educational expenditure which are incurred not by the educational authorities alone but by other Ministries or depeartments as well as the Private Sector. *Therefore, in considering the expenditure on education in the context of economic growth it is essential to take into account in a comprehensive way all kinds of expenditure on education.*

For measuring economic growth almost all of them have used per capita income growth or other indicators like consumption of electricity. In recent years doubts have come to be expressed as to whether this is a satisfactory measure of economic development specially in countries which are having subsistance sector like India and other Asain countries.

For measuring educational development some studies have used enrolment ratio of the concerned age group, others have used the retention ratio, while others have used completion ratio. In some cases the enrolment at a certain level per 10000 of the population has been used.

Education is wanted by the people both for its own sake and for what it helps them to earn. The society wants education to be given to the people for what it can do for them as well as for the society. Thus, education is both consumption and an investment. The consumption and production effects of education may be regarded as complementary from the point of view of the growth that is desired by many countries. This character of education as a joint product makes one doubt whether any close correlation can be found between the aggregate amount of education measured by the cost of education or by the number of student years embodied in the labour force and the growth of production.

In studying the effects of educational production it is doubtful whether we can adopt an aggregative approach. A highly differentiated approach would seem to be essential. A distinction has to be made between systems of education, methods of education, curricula and levels of education. In addition there are also inventions and innovations in education themselves increasing the efficiency of the investment of education as well as the cost of spending more years in the class room.

Apart from this in a policy for development of economy, attention is focussed only on these variables which are regarded as critically important from the point of view of the development. Thus the existing theories of economic growth have based their approaches on savings and capital accumulation because on the basis of the Harrod Domar model investment in physical capital is regarded as the most important factor which will bring about addition to national income.

Methods of national accounting which are varied for developed and organised economies like U.K. and U.S.A. are being used for measuring economic growth.

It is now being realised that there are factors other than investment which can influence the rate of growth of an economy. Even things like savings are very much influenced by non-economic factors like the attitudes of the people and their motivations. There is now a change in emphasis from investment to various types of social and institutional changes that are indispensable if the economies are to grow. At the same time the ideas with which the Economists have been dealing with also have to be changed. Examples are employment and labour input. The very measurement of economic growth will have to be changed. The rate of growth of per capita cannot be regarded as a measure of economic growth.

Though education is spoken of as one entity there are many aspects of education which themselves lend to economic analysis. They are :—

(*i*) The gestation period for the individual finished product in education is high. It can be varied within limits. From the view of growth the problem is how far to prolong education with regard to its marginal effect on production.

(*ii*) As in the case of land fertility of human raw materials is widely scattered and individual abilities vary.

(*iii*) Regarding enrolment in higher education the law of diminishing marginal returns will affect.

(*iv*) Education is a long term investment which effects production several decades ahead. We cannot take economic development for granted and adjust education to it. Education will certainly have an effect on the overall rate of growth. Decisions about investment in education must be related to the prevailing preferences regarding the time flow of investment and consumption.

(*v*) Technological trends may be explained by qualities in population that are related to education and no correlation analysis will bring this out.

Educational Expenditure and Economic Growth

1. An important problem in educational planning is to decide on the amount of money to be spent on education.

2. At present, in some of the plans of certain countries, the problem is solved by having as targets, the percentage of national income to be spent on education (6 per cent of GNP

for India in 1980) or a multiple of the per capita expenditure on education (for example, again India which has decided to spend 6 times as much per capita on education) or as percentage of the budget to be devoted to education by the government.

3. It is our contention that none of these methods of deciding on the expenditure on education is a very great help except as a broad guideline. For instance, international agencies like UNESCO are trying to, and have partially succeeded in focussing the attention of the public on the need for raising the amount of expenditure to be devoted to education as a percentage of national income. The Karachi Plan target was the target of Japan of 1950, *i.e.*, every country in the Asian region must strive towards the goal of spending 5 per cent of GNP on education. As a result, many countries have stepped up their expenditure on education as a percentage of national income as the following table shows.

Table 3

Per Capita Expenditure on Education in U.S. Dollars in Countries of the World, 1955 and 1965

	% of Countries Spending					
	Less than 1 dollar.	1—5 dollar	5—10 dollar	10—25 dollar	25—100 dollar	100 and more
1955	12·5	33·3	25	18·8	10·5	—
1965	4·7	27·9	19·8	16·3	27·9	3·5

Source : International Developments of Educational Expenditure by Prof. Edding. Page 22.

The above table shows that the number of countries which are spending small percentages of their GNP on education have decreased and more countries have moved over to higher positions of expenditure on education as percentage of national income.

Per Capita Expenditure on Education

In terms of per capita expenditure on education also, many countries in this region have moved to higher positions. There are few countries which are spending only small amounts as per capita expenditure on education as the following table shows.

Table 4

Public Expenditure on Education as % of National Income in Eleven Countries, 1960 and 1965

Public Expenditure on Education as % of National Income	No. of Countries	
	1960	1965
1% or less	1	—
1·1% to 2	3	1
2·1% to 3	4	2
3·1 to 4	1	3
4·1 to 5	1	1
Over 5%	1	1
	11	11

Source : Regional Office of Education 'Progress of Education in Asian Region'. Page 45.

Expenditure on Education as Percentage of Public Budget

Another most important yardstick on which attention will have to be focussed is the size of expenditure on education as a percentage of total public budget. This becomes necessary because countries of the world differ in regard to the size of the public expenditure devoted to all purposes. They also differ in regard to the elasticity of the government income of revenue to the rising of taxes. Consequently, when we decide to set up a target of educational expenditure, it is not enough if we specify a certain percentage of national income or a certain rise in per capita expenditure on education but it is also necessary to specify the assumption regarding the extent to which the revenue from taxes will rise for the government and the size of the public sector as indicated by government expenditure will increase.

Expenditure on Education and Rate of Growth of GNP

In certain countries, the planners have tried to adopt the method of linking up the expected rate of growth of GNP with the rise in expenditure on education. For instance, the countries which participated in the Mediterranean Region Project decided to increase annually the rate of expenditure on education at twice the rate at which the GNP was supposed to grow.

Correlation of Expenditure on Education and Rate of Growth of GNP

Available evidences regarding expenditure on education and rate of growth of GNP show a slight amount of correlation and this varies between developed and developing countries. Therefore, it does appear to be reasonable to tag on the rise in expenditure on education with the rate of growth of GNP. This does not in any case indicate any cause and effect relationship between expenditure on education and rate of growth of GNP.

There cannot be any definite criteria for increasing the expenditure on education. There should be a financial plan which is also forming part of an educational plan. We will indicate later in this paper the main elements of such a financial plan.

Complementary Relationship between Educational Expenditure and the Social Services Expenditure

A real difficulty about any guideline for expenditure on education is due to the fact that there is no definite knowledge regarding the contribution of education to economic growth. The input-output relationship that can be found in the case of other physical capital cannot be repeated in this case because of the very different nature of education. It is the structure content and quality in addition to the quantity of education. In addition, one has also to take into account the kind of persons to whom this education has been given. Therefore, at best, it is possible for us to think of a criterion for expenditure on education which includes both expenditure on education as well as expenditure on other social services.

Limitation of the Investment Approach to Educational Planning

There are a number of studies which have tried to spell out the implications of the view that education is an investment but none of them has so far succeeded in putting out a criterion for allocation to education. Even in countries like United States where a good deal of data are available regarding level of education of the labour force, the earnings of the educated people, the expenditure on education etc., educational planning and particularly educational policy has not been influenced by such quantitative evaluations of education. If this is the case in highly developed and organized societies like U.S.A. or U.K., it is much more so in countries like India where the rural-urban differences are very great and one cannot speak in terms of an integrated situation.

However, the case for additional expenditure on education particularly in improving the level of literacy of the population and increasing the level of primary education of the pupils rests on the ground that a minimum level of educational development is a basic input and it is time that we regard it as an infrastructure. Even if it is argued that in countries like U.K., free and universal primary education was introduced only 100 years after the advent of industrial revolution, there is the case of a country like Japan where the increase in the level of education of the labour force has enabled the population to adapt itself to changing technology and increasing production. In addition, in our country, there is the Constitutional Directive of universal and free primary education to children in the age group 6-14. These arguments make it necessary for us to increase the amount of money allotted to education and if adequate resources are not available to ensure that the best use is made of all the resources available to education and even if necessary think in terms of a change in the strategy for economic development if that is called for in order to achieve these educational objectives.

Quantitative studies and researches have tried to :

(1) Measure how much the educational effort or the total stock of knowledge contributes to the gross national product.

(2) It has tried to calculate the internal rates of return (return from investment in education is measured in terms of the increased life time earnings accruing to a person. In effect, a rate of return is calculated which equates the increased expected income with the added expenses and foregone earnings of the person who has been continuing his education). This has been calculated both for the individual and for the society from different levels of educational attainment.

With the help of such studies, Economists have tried to answer questions like the following :

(*a*) How much will the production of goods and services in a country increase if more spent on education ?

(*b*) How much more can a person be expected to earn if he graduates from high school as contrasted with an elementary school.

(*c*) Secondly the rate of return has been used to point out the profitability of investment in education as compared to investments in other fiscal capital.

However, these two objectives have not been brought together either by translating in quantitative terms the views of the general public or by pursuing some of the social implications of the view that education is an investment.

Suppose the returns accruing to Negroes in U.S.A. coming out of the educational system are lower than the returns accruing to the Whites ; would it mean that the policy of subsidising Negroes be discontinued ? Certainly such conclusion cannot be drawn. In fact, certain Economists have drawn the opposite conclusion from the level of return that has been found in regard to such persons. It is argued that the existence of a low rate of return for a certain kind of education is an indication that more should be invested in that particular level of education because such a low return for that kind of education is on account of high income elasticity or demand for education. Thus the existence of a low level of return leads to two opposite conclusions regarding the amount of investment to be made. Therefore, it is not surprising that the return approach should not have resulted in any profitable guideline regarding allocation of resources to education, even in countries like U.S.A. or U.K. where this concept return from investment in education originated.

The Position Regarding Returns from Investment in Education in India.

In India there are a couple of studies which have tried to measure the returns from investment in other kinds of capital (a thesis by Nallagounden). There are also some studies which have tried to measure the differential returns accruing to different levels of education. We wish to suggest that such rates of return studies are not sufficiently reliable guides for allocation of resources to education. The returns from investment in education in a country like India are influenced by many factors :

(1) The labour market is not highly organized in India. One can distinguish the labour market in the rural sector and the labour market in the urban sector. In the absence of such an integration, the returns accruing also are likely to be highly imperfect.

(2) The returns from investment in education cannot be measured by differential earnings between the educated and the uneducated. The levels of earnings of persons are influenced by several consideration like the employers' preferences which are based on habit rather than rational considerations.

(3) The level education of a person may have an influence on his habits and motivations as for example the willingness of an educated farmer to accept modern methods of cultivation. As a result of this, there may be a time-lag before education has its impact on the

national income of a country or the levels of earning of a person.

(4) On account of the existence of the organized and unorganized sector in a country like India, one can very well doubt whether the national income of India is a sufficiently reliable indicator of the impact that education is making on the progress of the economy and the society. Therefore the view that education is an investment is not very helpful in decisions regarding the allocation of money to education.

Need for More Attention to Internal Economies of Education

This, however, does not mean that the Economists have no contribution to make to educational planning in India. There are problems relating to the use of resources in education. There is the problem of variation in unit cost by levels of education and so the problem of getting optimum relationship between the cost and quality of education. In fact, there is the very measurement of the concept of quality of education at the micro level. Further, there are problems relating to the assessment of efficiency of many educational programmes like science improvement schemes, provision of mid-day lunches of school children at the primary level etc. These problems surely have an economic dimension and the major task of economists in India appears to be to provide guidance in regard to these matters.

APPENDIX V

Preparation of Projects in Education—an Illustration with reference to Vocational Education in India

It is customary to complain that the plans in India—both economic and educational have been prepared well but they go wrong only in the stage of implementation. This, however, is only partially true. Part of the difficulties in implementation of plans in India arise out of the inadequate preparation of the schemes which find their places in the plans. The schemes are not treated as projects and the various aspects relating to the projects like their importance in the overall plan, the stages through which they have to pass for successful implementation and their internal relationship with other projects are not fully thought out. In this paper, we have tried to illustrate the process of preparing a project with the help of an example drawn from the field of Indian education, namely, vocationalization of education at the school stage.

Objectives of the Project on Vocationalization of Education

The very first step in the preparation of any project is clarification of the objectives of the project. The Education Commission of India regards vocationalization as a device with which education can be brought nearer to the needs of Indian economic development. But the Education Commission of India has pointed out that as early as 1882 vocationalization of secondary education has been advocated. It cannot be said that nothing has been done to vocationalize Indian education. But the enrolment in general education continues to be high and in vocational education low. Therefore, it is necessary to investigate the reasons for the slow progress of vocational education. We can investigate the social and economic background of the pupils who are enrolled in vocational education in order to see how popular these courses are with the different social and economic categories of pupils and the jobs that they are able to get after they complete these courses of studies. The opinions given by the employers of such persons will be helpful in knowing how well the courses meet their requirements and what other things they require.

Cost Benefit Analysis of Vocational Education

The existing programmes of vocational education can be subjected to an analysis within the cost benefit framework. The per pupil cost in vocational education is high, sometimes even higher than in the third level of education in arts and humanities. The cost per pupil has to be calculated carefully after taking into account all items of expenditure. Sometimes the published accounts regarding expenditure on education will not give adequate information and *ad-hoc* enquiry in selected institutions may be necessary.

The benefits from vocational education can be partially measured by the salary earnings that the products from the vocational schools get. The salary earnings have to be converted into life time earnings taking into account the expected working life of the persons and such life time earnings have to be converted into present income by discounting with an appropriate rate of discount. The object of the cost benefit analysis is to find out the profitability of the vocational educational courses and it will be indicated by the benefit cost ratios. The benefit cost ratios will have to be maximized.

Limitations of Cost Benefit Analysis

The cost benefit analysis technique here assumes that the earnings of the vocationally educated man represent the benefit of vocational education (We have not gone into the question of individual and social benefit). Further, this technique is helpful only in showing which of the projects are more profitable than the other, say for example, vocational education given through the formal schools or on the job in industries. But very often the planners are confronted with a number of projects from which a choice has to be made. Therefore, there should be some device on the basis of which projects can be ranked in the order of their importance. We shall show below that a systems analysis will be helpful in ranking the projects.

Complementary Relationship with Other Projects

We can easily see that if the project of vocational education is to succeed, the following projects also will have to be chosen because they are complementary. Those projects are :

(*a*) Vocational guidance for pupils.

(*b*) Supply of information on the employment market in different parts of the country.

(*c*) A project for identifying new occupations that are likely to come and changes in the pattern of existing occupation. Information on this can be obtained from the farms and industries who may have their own plans for technological development calling for new skills. Sometimes technological changes like the green revolution in the Indian agriculture can be taken into account which are bound to give rise to new occupations. It will also be helpful to take into account the present relationship between the level of education and productivity in some of the occupations on the basis of which conclusion can be drawn as to whether improvement in skill acquisition is required.

(*d*) It is also necessary to study some important categories of occupations in selected industries to find out in what way those skills have been acquired by the concerned persons. In particular, we can find out whether they have acquired by undergoing training in the formal system of education or on the job training.

Since all these projects serve the common objective of achieving successfully vocationalization of education, they may best be considered together.

Systems Analysis for Ranking the Projects

As we pointed out earlier, planners have the task of ranking a bunch or projects on the basis of their importance rather than selecting one project. Therefore, what they require is a preferred mix of projects. In such areas of decision making, systems analysis can be adopted very successfully. Systems analysis can be used for improving decisions at all levels in education. Ranging from the decision as to how much is to be spent on education in relation to other sectors of economic activity to the level of class room as to what has to be taught. But it will require discussions of qualitative considerations like political factors which cannot be quantified as well as quantitative ones. Such a systems analysis will be more helpful for decision making at the lower level. In fact, systems analysis at these lower levels of decision making will provide solutions for the higher levels of decision making. Taking the example of water resources project, the following table gives the information that is needed for improvement in decision making. The analytical factors which have to be taken into account are illustrated. Since the project under consideration is a water resource development project, the table has given the present worth of the project, possible variability of the outcome, the effect on the personal income distribution and the internal rate of returns of the project.

SYSTEMS ANALYSIS TABLE

The Use of Systems Analysis in Choosing the Preferred Mix of Projects

Analytical factor		Proposed project.			
		1	2	3	4
(1) Present worth (*a*)	(Rs.)				
(*i*) Discount it $2\frac{1}{2}$ per cent	(50 yrs.)				
(*ii*) Discount it 5 per cent	(do)				
(*iii*) Discount it 8 per cent	(do)				
(2) Possible variability of outcome.					
(*i*) Most likely range of present worth.					
(*ii*) Range of present worth outside of which outcome is very unlikely to fall.					

(3) Effect on personal income distribution.
  (*i*) Number of farms affected.
  (*ii*) Average value of land and buildings per farm in watershed.
  (*iii*) Average net benefit per farm owner.

(4) Effect on regional wealth distribution.
  (*i*) Average increase in per family income in the basin.
  (*ii*) Percentage increases in average income in the basin due to the project.

(5) Internal rate of return of the project (per cent). (*b*)

(*a*) Present value of estimated benefit minus present value of estimated cost.

(*b*) The rate of discount which reduces future value to present worth.

Source :—The analytical base of systems analysis by G.H. Fisher, Rand Corporation, May 1966.

It may be noticed that this kind of analysis can be applied to any number of projects and they can be ranked on the basis of these analytical factors.

It is usual for projects to be evaluated while they are in progress or after they have been completed. But it is necessary to evaluate these projects even before they are included in the plan. The cost of each unit of activity included in the project has to be accurately measured and the total amount of the project as well as the plan will have to be tested in regard to its financial feasibility. We have to find out whether the plan as prepared consisting of a number of projects can be implemented with the resources that are likely to be available. If in the judgement of the planner, the resources likely to be available are much less than what is asked for than the prouning of the plan can be done by postponing or cutting those projects which have got a lower order or priority which is clearly indicated by the device of ranking of the project.

APPENDIX VI

Economics Course for District Education Officers in a Staff College in India

We have given below a model of the contents of a Course in economic aspects of educational planning for the district education officers in a Staff College for educational administration. The idea is not to give them a course in economics as such but only to make them familiar with the economic aspects of educational planning in India. In fact, the emphasis will not even be on economics of education but it will be on economic aspects of educational planning in India. This kind of Course is necessary for the district education officers because of the new role that the district education officers will have to play as developmental agent.

Broadly, we can divide the contents of such a Course into three :

(*i*) Internal aspects of economics of educational planning ;
(*ii*) External aspects of economics of education ; and
(*iii*) General economics.

Internal Economics of Education : Under this division, the topics that will receive attention are the following :—

(*a*) The internal allocation of funds for education for every level like primary, secondary and higher education and also by items like teacher salary, equipment, cost etc.
(*b*) The evaluation of real cost of education and the use of unit costs as an instrument of management and administration.
(*c*) The measurement of the productivity, output and efficiency of educational systems. In discussing these

problems, integrated techniques like systems analysis, techniques of administration, operational research etc. will be adopted.

External Economics of Education : Under this heading the idea is to take care of those aspects of economic development which are influenced by education. They will be classified as follows :

(*a*) The part played by education in economic development with reference to studies bearing on the developed countries as well as developing countries in Asia, Africa and Latin America.

(*b*) Education and employment with reference to the survey of the economically active part of the population and its trend, methods of forecasting the trend of the active population, the use of such forecast in the planning training and problems of adoptation between the demand and the supply of vocational education.

(*c*) The development of education and the problem of the allocation of funds with reference to the level of economy as a whole and also with reference to the government revenue.

General Economics : Under this division, the idea is to enable the district education officers to converse with people working in other departments like agriculture, industry and health and also to enable them to meaningful conversation with the overall planners in the State Planning Departments or Finance Departments as well as the Central Ministeries and Planning Commission. Broadly, they can be classified as follows :

(*a*) Methods of allocating funds to different sectors in a planned economy.

(*b*) The general economic data with reference to every State in regard to accounting and the meaning of concepts like production, income, savings, and investment and budgetary systems.

(*c*) Problems of development with reference to the process of economic development, method of planning by the Government and the conversion of the plan into budgets.

The above outline has given the contents of the Course in a broad way. They will be integrated with the process of educational planning and they will have to form an intimate part of the course on educational planning. Of course, they will be brought in at the appropriate stages. There are theoretical books on all these subjects and they have to be made applicable to conditions prevalent in India by undertaking suitable studies. These studies will provide the basic material for teaching.

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